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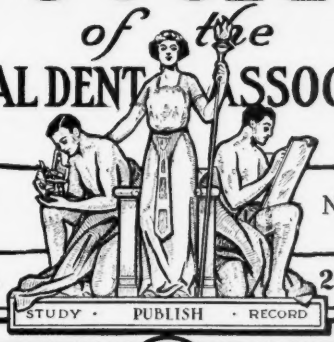

NOVEMBER, 1917

Microscopic Pathology of Chronic Osteitis.

Gunshot Wounds in Jaws and Face.

Lecture on Gunshot Fractures of the Jaws.

Review of Dental Literature.

Average Denture Construction a Disgrace.

Exempting Dental Students from Draft.

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New National Officers.

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Original Communications.

AN INVESTIGATION AND REPORT OF THE MICROSCOPIC PATHOLOGY OF THE CEMENTUM AND PERIDENTAL MEMBRANE IN AN EXTENSIVE CASE OF CHRONIC OSTEITIS, SO CALLED ALVEOLAR ABSCESS WITH A SINUS.

By Joseph Eisenstaedt, M. D., D. D. S., Chicago, Illinois.

(Read before the Annual Meeting of the Michigan State Dental Society, April 14, 1917.)

THE privilege of presenting a subject for consideration before a representative body of dental surgeons such as this, is rarely given one whose work is yet to be criticised. This gives me a sense of responsibility never before assumed and a deep appreciation of the honor conferred.

Fully realizing that the scientific nature of the subject is not likely to be so interesting as the operative side of dental surgery, I have made every effort to collect all clinical and practical data relating to the cases which I have investigated by microscopic and medical research.

The time allotted for reading the paper is so limited that we can survey only some of the principal microscopic findings to the end that certain statements may be made concerning the essential pathological facts worth discussion.

The stimuli and foundation for my investigation lie in a number of neglected so-called abscess cases, the tissue changes of which I could not fully comprehend from the descriptions presented in our literature; furthermore, I wished to learn more definitely the relation of the changes in the infected cementum and the peridental membrane to the repair of bone in the alveolar process.

To many who have kept pace with the literature on the relation of oral foci

of infection to systemic disease, it may seem that the portion of the subject as presented is no more than a recapitulation in different words. However, I believe some of the evidence presented will cause a change of view concerning our methods of caring for chronic abscesses; otherwise I would deem my mission here not worth while.

Since we have assumed the extraction of teeth to constitute a means for completely removing oral infection, an assumption obviously not sustained by clinical evidence, and since there must be good reason for the failure to relieve the septic condition, we are justified in seeking for a remnant of the infective agent at its original seat in the adjacent cancellous bone of the alveolar process.

If, for example, the general surgeon would care for osteitis of the long bones as we treat osteitis in the alveolar process, he would not be able to secure results any more satisfactory than we do, following simple extraction of the teeth.

After a most exhaustive examination of the literature on oral focal infections for the past two years, I have found no microscopic evidence submitted, illustrating the cellular changes occurring in the supporting tissues of the human teeth. From the conclusions drawn after reading the various articles in the literature, it seems clear that it is the pathology of the bone involved which has not been considered with relation to the effect of chronic abscess, or rather osteomyelitis, upon systemic conditions. If the pathology had been better understood, we would not find numerous cases presenting themselves three or more months after the extraction of teeth, with obvious evidence that no relief from the systemic condition had been attained even after all other foci in the body had been carefully excluded and the patient's dietetic and hygienic errors corrected.

My research work has convinced me that we must eradicate the osteomyelitis or the osteitis in the jaws in the same manner as the general surgeon deems necessary in the case of osteomyelitis of the long bones. Therefore, a thoro curettement of the bone involved in the apical region and in the peridental bone of the socket should be made, and all rough spiculae of bone forming the crest of the alveolar process which has been infected from gingival pericementitis should completely be excised until a smooth surface of sound bone is secured. This latter procedure furthermore enables a vulcanite or metal saddle to ride the process more evenly under the forces of occlusion.

It seems advisable before presenting the history of the patient, the clinical findings, the radiographic diagnosis, the microscopic pathology and the treatment pursued, that a review of some of the more important histologic facts and physiological principles related to the changes seen under the microscope should be made.

"Some Essential Principles of the Physiology and Histology of the Peridental Membrane."

The cementum is a passive tissue, entirely depending upon the Peridental Membrane for its vitality; it has no individual vascular blood or lymphatic system. It cannot, therefore, repair itself. The peridental membrane thru its cellular elements, the osteoblasts and the cementoblasts, form the bone of the alveolar process and the cementum of the root when the circulation and integrity of the membrane is in a physiological condition. Aside from its sensory function, the peridental membrane thru its blood vessels and glands, as well as its fiber bundles, offers a means of protection by limiting the progress of infection in the alveolar process in precisely the same manner that the periosteum limits suppuration on the surface of long bones. The deposit or regeneration of lamellae

of cementum around the apical foramen after aseptic removal of the pulp, is sufficient evidence of the defensive and reparative energies possessed by this membrane.

Clinically, therefore, we must keep in mind that no cementum can be formed if the peridental membrane and cementum have been impaired for any material length of time by the toxins following suppuration in the alveolar process, or if the protoplasmic activity of the osteoblasts and cemento-blasts have been retarded or arrested by drugs administered during root canal treatment.

With these facts in mind we are now in position to consider some of the significant clinical findings presented in two cases of osteitis.

"Some of the Significant Factors in the Clinical Histories and Findings of Two Cases of Chronic Osteitis, One with a Sinus, and One Without a Sinus, a so-called Blind Alveolar Abscess."

Only one case, i. e., the case with the sinus has been studied microscopically; the changes in the tissues of the second case have not been studied, owing to the fact that no microscopic sections have been made to date.

It is interesting to note that the pulps of the teeth with the adjoining alveolar process which were involved by the osteomyelitis in both patients, did not give evidence of their death either by pain or by any change in the color of the teeth. The complete and sudden strangulation of the blood supply to these pulps is the only explanation I can offer to account for the negative symptoms.

There are three other points to which attention should be directed for a better understanding of the infective process:

(1) *The extent to which bone has been destroyed.*

(2) *The Relation of Time to Process of Bone Absorption.*

(3) *The Defensive Power of the Peridental Membrane in Devitalized Teeth.*

(1) The process of bone destruction occurs in a progressive but slow manner, each lamellae is decalcified and each bone cell dies, accompanied by the enlargement of its lacunae or space in which it is embedded, from the liquifying action of the suppurative products. The bone destroying cells or osteoclasts soon excavate the decalcified lamellae or bone layers by pressure resulting from their protoplasmic movement.

(2) The amount of time for this process is variable, depending upon the intensity of the suppurative process and the individuals resistance. It is conservative to state that from two to four years elapsed for the production of as large a cavity as was revealed at the operations. Also, that this extensive, but slowly acting process is seldom accompanied by the common acute inflammatory symptoms of pain and fever.

(3) The Defensive Power of the Peridental Membrane in Devitalized Teeth is shown by the difference in the degree of tissue destroyed in the upper left central incisor (devitalized) and canal filled, in comparison to the upper right central incisor and other anterior teeth whose pulps had not been removed but which suffered from the strangulation of their blood supply, as shown in Fig. 4. We can account for the injury and changes in the peridental membrane only by the interference with its resistance and vitality following the root canal treatment and filling which destroyed the cellular activity of the leucocytes, fibroblasts and cemento-blasts located around the apical foramen. Necessarily, no organizing membrane of defense could develop to combat the infection introduced thru the labial sinus of the alveolar process.

The following is a personal history of the patient, having the labial sinus, his clinical dental history, radiographic diagnosis and treatment:

PERSONAL HISTORY.

1—Male, age 62, had mild attacks of articular rheumatism for six years prior to date of operation, Feb. 5, 1915. Had been treated for pain radiating into the left heel. No history of tuberculosis or syphilis; but arterio sclerosis of the aorta recently has been diagnosed.

CLINICAL DENTAL HISTORY.

2—For four or five weeks he had complained of tenderness in biting upon the upper anterior teeth. The upper left central incisor from which the pulp had been removed, was filled two months previous to his first visit to my office. Closure of the sinus between the central incisors failed to take place after curettement. No pain; no temperature or chills had occurred. All the anterior teeth were quite firm to finger traction made in a labio-lingual direction.

EXAMINATION OF PULPS.

3—In the upper cuspids, lateral incisors and the right central, no response to extreme cold (from ice) could be elicited; no sign of caries, calculus or pericementitis was present in or around the gingival thirds of the roots.

"Clinical Diagnosis of Chronic Osteitis."

PRESENCE OF SINUS AND BONE CAVITY.

A—Between the roots of the upper central incisors was an oval sinus about three millimeters in length gingivo-apically, at the level of the middle third of the roots which released a serious exudate; this was examined for cholestrin crystals and found negative. Upon exploration with steel probe, a cavity was found extending on the right side to the upper first molar and lingually to the wall of the antrum; on the left side, to the distal surface of the left cuspid.

CONDITION OF THE GUMS AND MUCOUS MEMBRANE.

B—Palpitation over the roots of the upper six anterior teeth gave a hollow springy sensation to the fingers. On the labial mucosa, about three or four mm. apically to the crest of the free gingivus, were small round pinhead elevations of a hard and resistant character similar to bone spiculae. These extended from cuspid to cuspid. From this level of the gum to the junction of the lips and the gums at the floor of the nose, a dark red mucous membrane presented, insensitive to palpitation. (See Figs. 1 and 2.)

RADIOGRAPHIC FINDINGS.

C—A series of radiographs of the upper teeth revealed the following:

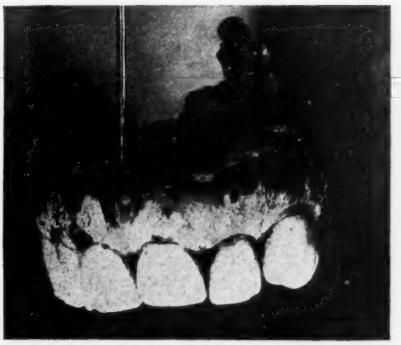
Around the roots of the four incisors and the greater part of the lingual and mesial surfaces of the left and right cuspids, bone had been destroyed extending from the floor of the nose to the level of the gingival third of the alveolar process. The peridental membrane around the four incisors was destroyed to a point about one-eighth of an inch from the crest of the alveolar process. Two-thirds of the roots of the central incisors showed complete loss, both of peridental bone and peridental membrane. (See Figs. 3 and 4.) The upper right lateral incisor showed a definite apical excementosis absorption of apical 3rd of the upper left first bicuspid was involved by a chronic apical osteomyelitis or blind abscess.

OPERATION.

After careful comparison of the above radiographic findings with those revealed by exploration with the probe, an exsection of the process including the six anterior teeth, was decided. An exsection of these teeth was chosen for this reason:—The amount of bone beneath the periosteum and the remains of the septal bone near the gingival third of the root was so little that it

would have necrosed after extraction and packing, owing to the extreme passive congestion of the mucous membrane and

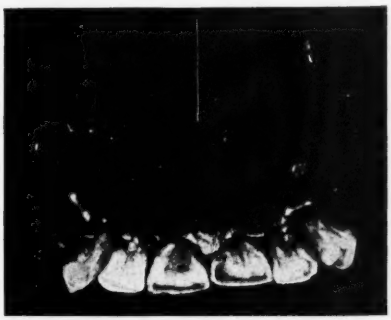
Figure 1.



Three-fourths labial view of upper anterior teeth with alveolar process intact as removed from mouth.

the limited circulation to these parts. Both the upper left bicuspids and the

Figure 2.



Lingual view of specimen in Figure 1.

right first bicuspid were extracted and the alveolar process removed. I used ether anesthesia owing to the fact that infiltration of floor of nasal cavity with novocaine was contra-indicated.

FINDINGS REVEALED AFTER THE OPERATION.

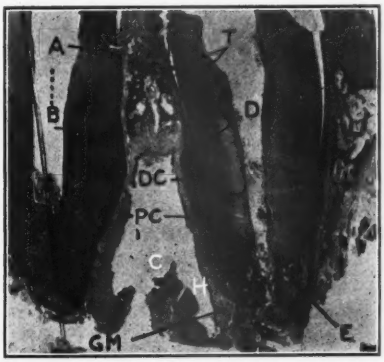
After removal of the six anterior teeth with the process, it was found that the cavity extended posteriorly below the

Figure 3.

Panoramic radiographic reproduction of area involved as modified by artist to show bone cavity (used in Dr. G. V. Black's "Special Dental Pathology.")

floor of the nose to a point midway between the anterior inferior nasal spine and the soft palate, almost completely

Figure 4.



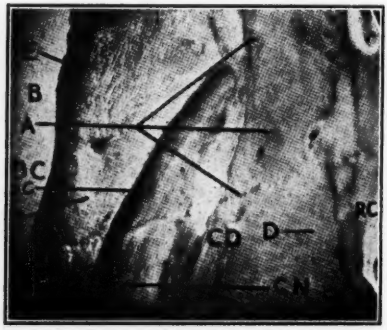
Longitudinal section of upper central incisors (inverted) magnification is four times the size of slide specimen, "A" to B, remaining peridental membrane with adjoining septal bone. "C," bone cavity. "G. M.," granulating membrane. "D. C.," Dento-Cemental junction. "E," area of dentine honeycombed by absorption and deposit of Haversian bone with its canals. "P. C.," granulating membrane has replaced peridental membrane, which was opposite labial sinus in labial plate of alveolar process. "D." shows thickness of new layers of cementum equal to width of old cementum. O. C., old cementum.

undermining the floor of the nose. No bone spiculae were found in the cavity, but a granulating membrane lined most of its bony wall.

After removal from the mouth the teeth with the process were fixed in 10% formalin, then decalcified in 5% nitric acid and cut into celloidin sections, stained with haematoxylin and eosin.

Fig. (3) shows the panoramic radiographic reproduction with modification by artist to show shadow defining bone

Figure 5.



Two-thirds objective, magnification of field indicated by legend "H," in Figure 4. "E," stratified squamous epithelium covering granulating membrane. B. C., bone cavity. "A," attached new bone growth to absorb dentine and cementum. "M.," granulating membrane, covering cementum. S. C., surface of cementum. "C. N.," cementum, "C. D.," Dento-cemental junction. "D.," dentine. "R. C.," portion of root canal.

cavity (as used in Dr. Black's Textbook of "Special Dental Pathology.")

See Fig. 3.

Fig. (4). Magnification four times of microscopic section of upper central incisors (crowns excised.) Shows the remains of the alveolar process especially the septal bone with its peridental membrane "A—to—B," bone cavity "C," excementosis generalized on mesial surface of right central incisor, at "D." At "E," apical region shows honeycombing of dentine by absorption and rebuilding of Haversian bone into excavated portions. "D'C" shows dento-cemental junction, "P'C," Peridental Granulating Membrane.

See Fig. 4 for legends and inscriptions.

MICROSCOPIC FINDINGS IN SOME OF THE TEETH AND THE ATTACHED ALVEOLAR PROCESS.

I.—*Longitudinal Section of Upper Right Central Incisor.*

1—*Apical Third Region.*

A—*Peridental membrane* has been changed into a fibrous granulating tissue on the mesial surface adjacent to the location of the labial sinus. See Fig. 4 P. C.

B—*Cementum.* This tissue has been destroyed and replaced with a fibrous granulating membrane accompanying the attachment of regenerated bone. See Fig. 5, half-tone, for explanation of legends.

C—*Peridental Bone* as well as the cancellous bone have been entirely lost.

D—*Bone Regeneration into Absorbed Dentine of root canal, of root apex and Cementum.* After careful examination of the entire apical region from the mesial to the distal side of the root, one can easily see that new bone has been formed as evidenced by the structural characters of the tissue and the manner in which it has been stained as compared to the dentine. I believe this new bone growth has occurred at the beginning of the osteomyelitis, and that the passive hyperemia accompanying the former process, has actuated the osteoblasts of the peridental membrane as well as those osteoblasts formed by a metamorphosis of the connective tissue cells in those marrow spaces which had not been affected by the fluids of the mouth or suppuration. The new bone has replaced a great deal of the lost dentine and cementum.

The activity of the osteoblasts has progressed to the extent that a thick wall of bone was deposited on the sides of the root canal soon after the dentine had

been excavated by the osteoclasts. See Fig. 6, "B." (See key to legends in half-tone prints.) The growth of new bone has proceeded in such a manner within the dentine on the distal side of the canal as to honeycomb its entire structure. See Fig. 7, "B.'B."

MICROSCOPIC CHANGES IN CEMENTUM OF ALVEOLAR 3RD OF ROOT.

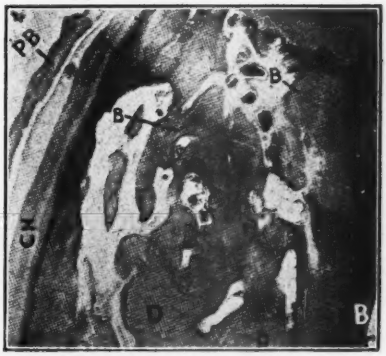
At the arbitrary division of the apical and the alveolar thirds of the root, absorption has occurred, not alone in the old cementum, but in the deeper layers of the newer cementum, as evidenced by the haematoxylin stain. The lamellae of the newer cementum are very indistinct and a decided decalcification is indicated by the appearance of their ground substance. The outline of the lacunae likewise cannot be traced with high power magnification. In the deeper or older layers of the cementum at the junction of the newer and older layers, we find a very irregular line of demarcation. Absorption has occurred on the surface lamellae of the older cementum which have been rebuilt, that is, new cementum has been built directly into and upon the older lamellae. The embedded or calcified fibers of the peridental membrane can be traced for a short distance. The most characteristic difference between the lamellae of the newer and the old cementum is the decided difference in texture; in the new cementum the lamellae are wider and more wavy than in the old cementum. Covering all the cementum is a layer of granulation tissue metamorphosing into a fibrous membrane surmounted by a stratified layer of squamous epithelial cells which line the wall of the bone cavity. (See Fig. 5,) "E," "M" and tissue lying between horizontal lines of "A and C. N."

As we approach the mid-alveolar plane, the thickness of the cementum decreases and the lamellae become more indistinct or fused with each other; finally when we reach that portion of the floor of the bone cavity, formed by the remaining septal bone between the two

Figure 6.

Two-thirds objective magnification of field, from area of Figure 5 to the right of "D.," showing root canal, diameter at "R. C.," and enlargement from absorption and then rebuilding of area with bone at B, on both sides of canal. "H. C.," blood vessel engorged in enlarged Haversian canal. "D. D.," dentine, on sides of canal.

Figure 7.



Two-thirds magnification of area from same specimen. Apical region in Figure 4, as was shown in Figure 6, the distal half of root with cementum at "C. N.," and part of peridental bone at "P. B." B., B. B., new bone with enlarged Haversian canals attached to absorbed dentine resulting in the honeycomb arrangement of the tissue.

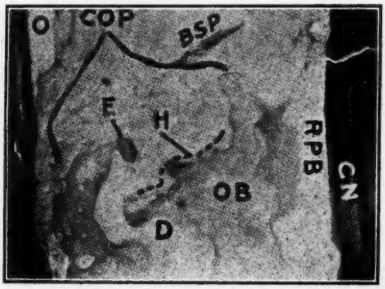
central incisors, we note marked changes have taken place in the septal bone and peridental membrane.

"ABSORPTION OF SEPTAL BONE" BETWEEN CENTRAL INCISORS.

Here is seen a direct union of the fibrous granulating tissue with spiculae of the absorbed and infected bone which remained in the site of the original bone. The marrow spaces particularly have been enlarged, and absorption has been so progressive that large cavities have formed within the septal bone as shown by the coalescense of six or seven ordinary marrow spaces, one with another. See Fig. 4-"T."

As we approach the crest of the alveolar process and the gingival third of the peridental membrane, we find more compact or Haversian System bone, which has filled in the cancellous bone, and note fewer changes in the peridental membrane even tho absorption of the peridental bone is progressing. The peridental bone clearly shows an active absorption and rebuilding; note E, crest of process, in Fig. 8—the rebuilt bone is easily distinguished by the difference in staining between the new bone lamellae and the old,—note "O. B." and "R. P. B." (Rebuilt peridental bone to left of letters.) There is a division of the septal bone extending from the bone cavity to the crest of the alveolar process, shown in Fig. 4, "T" and Fig. 8 "D," in which the transeptal fibers of the peridental membrane have grown down into and united with fibers of the opened marrow spaces to support the bone. The crest of the alveolar process shows definite absorption; see Fig. 8, E. H. and Fig. 9 at C. O. P., "G. P. D. M." gingival peridental membrane, "C. O. P." crest of process. Fig. 9, is a high power magnification of area between E and D of Fig. 8. "A" is the gingival space; F. G. F. indicates the course of the free gingival fibers of the peridental membrane whose bundles pass into the free gingivus or gum margin. See Fig. 9.

Figure 8.



(Inverted.)

Two-thirds magnification of area represented between "A. B." Figure 10, showing absorption of septal bone at crest of alveolar process. "O." gingival space. R. P. B., to the left of letters is area of rebuilt bone. O. B., old bone.

Figure 9.

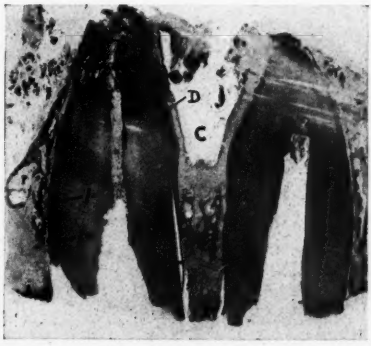
One-sixth objective magnification of area "E" in Figure 8, showing enlarged Haversian canal below C. O. P. and absorbed spicule of crest of process. Note how fiber bundles pass over crest of process to base with those of adjacent tooth.

CONDITION OF THE PERIDENTAL MEMBRANE GINGIVAL TO THE ALVEOLAR CREST.

Altho absorption of dentine and cementum had progressed continuously in the apical third of the root, until all of the peridental bone in this region

was removed, most of the fiber bundles were held intact in the gingival third of the membrane. See Fig. 9, G. P. D. M.

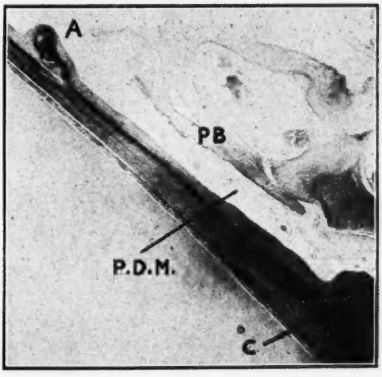
Figure 10.



Four times magnification of upper central incisors made from another longitudinal microscopic section.

The course of the fibers may be traced easily from the crest of the process into the free gingivus. Furthermore, the

Figure 11.



Two-thirds objective, magnification of areas between "I I" in Figure 10 to show field of localized excementosis at A. and C. P. B., peridental bone. P. D. M., peridental membrane.

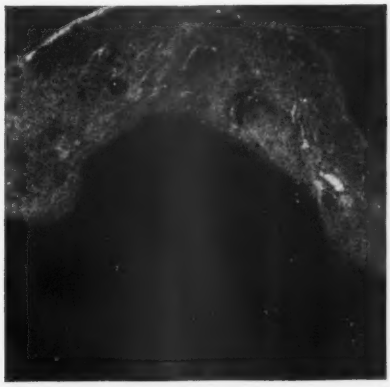
fiber bundles may be traced from the cementum of the right central incisor to cementum of the left central incisor. See Fig. 8. B. S. P. is a spiculae of bone detached from the rest of crest of alveolar process.

Regeneration of peridental bone is shown in Fig. 8 to the left of "R. P. B.," by the heavy stain of the new bone lamellae.

LOCALIZED EXCEMENTOSIS IN THE GINGIVAL ROOT THIRD.

On the distal surface of the right central in the gingival third of the alveolar process where absorption has been very extensive in the cancellous bone, evi-

Figure 12.



One-sixth objective, magnification of area "C" in Figure 11, showing knob of cementum and peridental membrane lying above and around it.

dence of regenerated cementum or an excementosis in the form of a knob is shown very clearly. Around this knob of cementum the fiber bundles are indistinct as they pass over the crest of the process. No lacunae or lamellae are present in this formation of cementum. See Figs. 10, (1′, 1″), 11, A & C and 12, (12 is high power of field C in Fig. 11) P. B.—peridental bone, P. D. M., —Peridental membrane. C. N. cementum.

PRINCIPAL TISSUE CHANGES IN UPPER RIGHT CUSPID.

1.—*Cementum,* Apical Third.

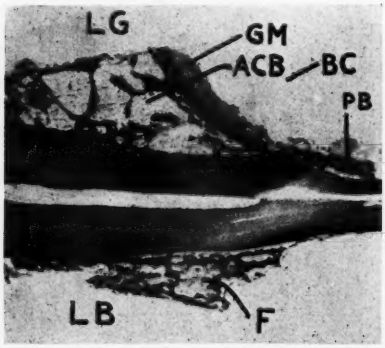
On the labial surface for a distance of five or more millimeters from the for-

amen, the peridental membrane has been completely destroyed to the point where some of the thickened regenerated peridental bone is intact. See Fig. 13 and 14.* The surface lamellae of the cementum are very irregular and show a decided decalcification. The outer lamellae do not contain any lacunae and the boundaries of the lamellae are very indistinct. The deeper lamellae show some lacunae and their direction is fairly clear. *On the lingual surface of the* and indistinct on this surface than on the labial because a greater amount of pus was in contact with the cementum than on the labial surface of the root.

3.—Peridental Membrane.

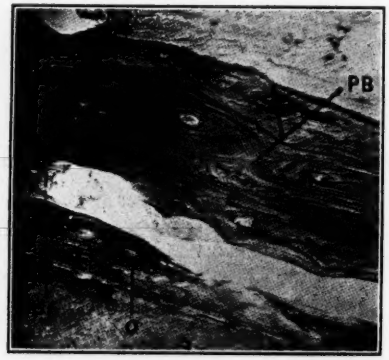
On the lingual surface this tissue has suffered less derangement and destruction than on the labial surface. The cementoblasts on the lingual surface evidently were more stimulated by the initial inflammatory changes than were those of the labial surface

Figure 13.



Four times magnification of longitudinal section of upper right cuspid showing remains of lingual and labial plate of alveolar process with thickened peridental bone and granulating membrane limiting wall of bone cavity. L. G. & L. B., Lingual and labial plates of process. G. M., Granulating membrane. A. C. B., Absorbed cancellous bone showing size of enlarged marrow spaces. B. C., Bone Cavity. P. B., Thickened peridental bone. F., Fibrosis in enlarged marrow spaces.

Figure 14.



Two-thirds objective magnification of field "P. B." in Figure 13.

apical third the cementum has not been as extensively destroyed as it was on the labial; only two to three millimeters of the peridental bone has been completely destroyed gingival to the apical formen. The lamellae are much more irregular of the root. Little of the membrane on the lingual surface, gingival to the middle third of the root has been involved, even tho the bundles of fibers are not wholly intact; this is evident by the deposit of new bone lamellae in the peridental bone.

In the gingival portion of the membrane, i. e., gingival to the alveolar crest, the transeptal fibers are still intact and their course may be easily traced over the remains of the crest of the process into the free gingivus. See Fig. 15, P. D. M.; "F. G.," free gingivus, "O" Gingival space. "C. O. P.," crest of alveolar process. C. N., cementum.

2.—Peridental and Cancellous Bone.

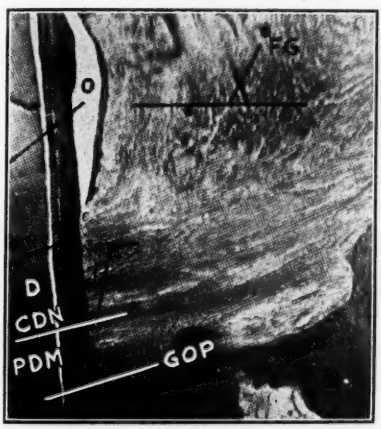
Gingival to *Bone Wall* of Bone Cav-

*Legends to Fig. 13, L. G.; lingual plate and L. B., labial plate of alveolar process; B. C., bone cavity; T. P. B.—Thickened Peridental bone; A. C. B., absorbed cancellous bone (marrow spaces); G. M., granulating membrane lining for Fig. 14; the labial wall of bone cavity, that is lingual to cuspid. F, fibrosis in marrow spaces. Fig. 14, is two-third magnification of area marked. "P. B." in Fig. 13, showing density of limiting bone cavity wall, with cementum "C" and dentine, "D," and part of peridental membrane shown at P. D. M.

ity, and adjoining the lingual surface of the root, greater absorption has taken place in the cancellous bone than on the labial plate of the process. Note that destruction of the cancellous bone has been more extensive than that of the peridental bone. It has extended almost to the crest of the process and few trabeculae remain to reinforce the peridental bone. See Fig. 13, A. C. B.

In the marrow spaces of the labial plate of the alveolar process fibrosis or fiber formation has occurred more freely and shows the stage of the chronic osteomyelitis in which absorption has not been so extensive. The contents of four or five narrow spaces which have been united, show a general meshwork to have been developed between one narrow space and another. See Fig. 13 F.

Figure 15.



Two-thirds objective magnification of gingival third of peridental membrane of cuspid. O., gingival space. F. G., free gum or gingivus. C. N., cementum. D., dentine. P. D. M., three distinct fiber bundles of peridental membrane, shown in Figure 13.

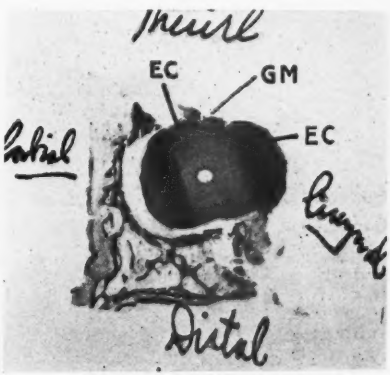
UPPER LEFT LATERAL INCISOR.

Mid-Alveolar Third. X section.

Some of the principal tissue changes:

The investive tissues of this tooth have suffered more constructive changes following the infective process, especially its cementum and peridental membrane than the other teeth; changes occurred on the mesial surface where a granulating membrane has completely replaced the structure of the peridental membrane. See Fig. 16, G. M., Magnification 4X, and Fig. 17, is a magnification with ⅔ objective of field marked G. M. in Fig. 16. E. C. and E. C. excementosis localized.

Figure 16.



Cross section of upper left lateral incisor in the middle third of the root. Magnification 4X. E. C., excementosis. G. M., granulating membrane.

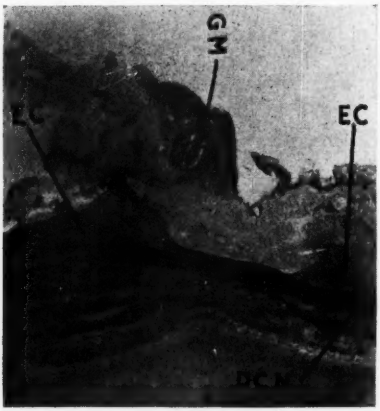
Marked excementosis is shown on the mesial and the lingual surfaces which have been directly in contact with the suppurative process. See Fig. 16, fields, EC, EC.

Destructive Changes in the Cementum.

Briefly these are manifested by areas of absorption and decalcification found on the mesial surface between areas of excementosis. The lamellae and lacunae in these regions are very indistinct. Many notches and irregular indentations are shown in that portion of the surface where granulating tissue is attached. See Fig. 17, this is a two-thirds objective magnification of G. M. area in Fig. 16. In most of the specimens of this tooth the peridental membrane has

been detached, due to the jumping of the microtome in sectioning and detachment due to process of decalcification.

Figure 17.

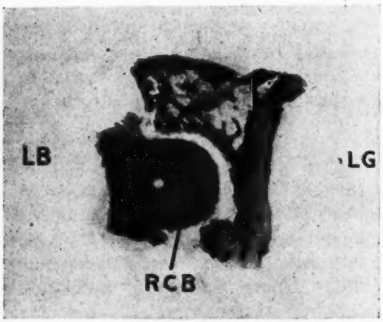


D. C. N. shows width of some of the old layers of cementum. Note the granular appearance of their ground substance. E. C. and E. C. show new layers or lamellae of cementum. Note limited extent and width of these lamellae.

Re-attachment of the Peridental Membrane.

In this tooth we see unquestionable

Figure 18.



Magnification 4X, microscopic specimen. L. B., labial surface, fractured away. L. G., lingual surface of tooth with detached peridental bone and granulating membrane of bone cavity.

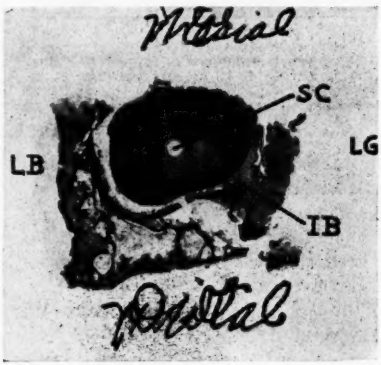
evidence of the membrane re-attaching itself as illustrated by the rebuilding of the cementum into dentine which had been absorbed and then refilled by new cementum. A definite line marks the

Figure 19.

R. C. N., Rebuilt cementum into the portion of dentine absorbed.

junction between the surface of the dentine excavated by absorption and the layers of cementum adjoining it. See Figs. 18, R. C. B., Magnification 4X,

Figure 20.



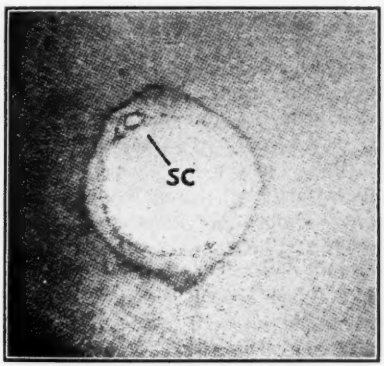
S. C., pulp canal. L. B., labial surface, of alveolar process. L. G., lingual surface of root with X section of lateral incisor, 4 X magnification.

and Fig. 19, a two-thirds objective magnification of same field in Fig. 18.

SECTION TAKEN AT THE GINGIVAL THIRD OF THE ALVEOLAR PROCESS OF UPPER LATERAL INCISION.

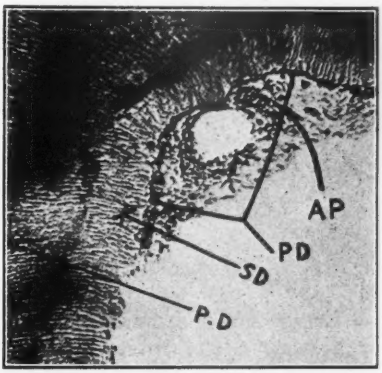
1.—The specimen shows bone on the lingual and the mesial surface only. The distal surface is completely devoid of its peridental membrane and alveolar process. At this level secondary dentine has occurred in two deposits around the canal. See Fig. 21, two-thirds objective magnification and Fig. 22, one-sixth objective magnification of area "S. C." in Fig. 21, P. D. primary dentine S. D.—secondary dentine; D. O. A. P., attached pulp with blood vessel; P. D., odontoblasts around blood vessel.

Figure 21.



Two-thirds objective magnification of area "S. C." in Figure 20.

Figure 22.



A. P., attached pulp, with blood vessel. P. D., odontoblasts around vessel. S. D., secondary dentine. P. D., primary dentine.

2.—*Cementum,*—is normally thin on the labial, but as we approach the proximal and lingual surfaces, excementosis has been very active, resulting in many new lamellae, five or six times as numerous as those composing the labial cementum.

There is no active absorption except on the distal surface adjoining the bone cavity and this has extended but for a short distance, i. e., for three or four millimeters. On the mesial surface and lingual surface where some of the peridental membrane is intact with the peridental bone, the fiber bundles seem to be fairly distinct and may be traced into the peridental bone which has been rebuilt, particularly on the lingual surface where it has occurred more extensively than on the distal surface.

The cellular activity, therefore, both of the cementoblasts and the osteoblasts, particularly on the lingual surface, has been most persistent, as indicated by the number of bone lamellae formed, and as may be seen by the extent to which the fibers of the peridental membrane have been calcified into them.

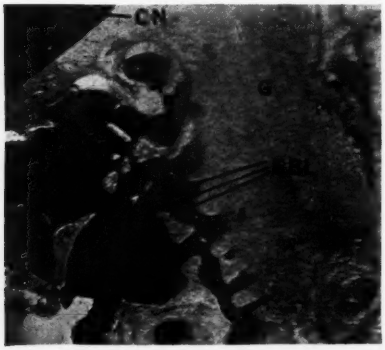
Fig. 23 shows the field "I. B." in Fig. 20, in which infected bone is distinguished from the attached absorbed bone by the enlargement of the former's bone lacunae. They are three or more times the size of normal bone lacunae. E. B. L.—enlarged bone lacunae. G. M., granulating membrane. C. N., cementum.

Some Conclusions Deduced from Changes Studied in the Investive Tissues which Have Been Examined Microscopically.

1.—The cure of an abscess, I should

say rather an alveolar osteomyelitis, with a sinus cannot be effected by canal treatment alone because of the fact that infected cementum is a foreign body to the cellular elements engaged in the process of bone regeneration. Therefore, not only should the tooth or teeth with a sinus of long standing be extracted, if an apiectomy is uncertain to be successful, but the bone forming the sinus and

Figure 23.



C. N., cementum. G. M., granulating membrane. E. B. L., lines point to enlarged lacunae of infected and decalcified bone. Old bone lamellae are shown to be dense black.

the apical region should be curetted thoroly so that any infected granulating tissue cannot remain as a source of future infection. It is the reinfection of the granulating tissue by the bacteria harbored in the infected cementum or bone lamellae, which accounts for the chronicity and persistence of alveolar abscesses that do not respond to canal treatment.

2.—The principal pathological lesions to be considered in an alveolar abscess are the osteomyelitis and the extent to which the peridental membrane has been destroyed. Therefore, after canal treatment has failed we must not always think the difficulty or failure is due primarily to a faulty technic, unless destructive germicides or coagulating drugs, such as phenol, have passed into the apical tissue.

3.—After thoro curettement of the socket and of the bone forming the sinus, proper drainage by packing and irrigating must be established and continued until the strength and density of the granulating tissue is sufficient to resist infection from the oral fluids and bacteria.

4.—Regeneration of bone in the alveolar socket after curettement and drainage is much more enhanced than if the removal of the tooth only, is undertaken.

5.—The vitality of the peridental membrane and the bone of the alveolar process is more often lowered by the antiseptic and germicidal agents used to sterilize the root canals, than increased.

6.—We must remember that the peridental membrane performs a protective function similar to that of the periosteum covering the long bones; that its cellular elements will respond if the source of the infecting agents within the canal can be controlled before their by-products decalcify the cementum and peridental bone.

In conclusion, it should be understood clearly that dental surgical interference and oral prophylaxis are not a cure for most of the secondary foci of infection from which patients are suffering. Furthermore, I believe it to be a most important duty for the dentists to understand the physical and nervous disabilities of the patient in other regions of the body and how they are being corrected by the physician.

GUNSHOT WOUNDS AND LESIONS PRODUCED BY SHELL AND SHRAPNEL IN THE JAWS AND FACE.

By Leo Eloesser, M. D., San Francisco, Assistant Clinical Professor of Surgery, Medical Department, Stanford University.

(Read before the San Francisco Section of the Preparedness League of American Dentists, May 8th, 1917.)

THIS war has not only developed much that is new, it has brought back much that is old; together with aeroplanes and submarines, Zeppelins and tanks, men have come back to bayonet fighting, hand to hand conflict with knives and sabres, and the most elementary means of combat. The wounds therefore are of the most varied nature. Before considering the various lesions it may be of interest to review the arms by which they are produced.

Wounds caused by knife, bayonet and sabre-cuts will be of little interest to you. They but rarely affect the dental apparatus. Their frequency in this war, however, has been considerable, more than hospital statistics show, because when a man thrusts with a bayonet in a hand to hand fight he thrusts to kill, and the victim rarely lives to reach a hospital. Of more concern to us are the injuries produced by firearms, by the classical infantry weapon, the rifle, by the machine gun, which is in reality merely a rifle worked by machine power, by hand grenades and bombs, and by the various kinds of artillery.

All the combatants in the present war use a bullet more or less cylindrical in shape; some have parallel sides, except at the tip, which is pointed; others are ogival, or cigar shaped. The old leaden bullets would melt in the barrel of the rifle under the modern high explosives, so that the lead has to be encased in a jacket of more resisting material, steel,

Figure 3.

French (A) and German (B) cartridges. Bullet has been drawn out of the shell.

nickel-steel, or nickel. The English bullet has a tip of aluminum and the French bullet has no jacket, but is of solid copper. The bullets weigh from 10 to 13 grams, have a calibre of from 6½ to 8 millimeters, a muzzle velocity of from 6 to 900 yards per second and carry 2000 to 2500 yards. The shape of the bullet, the nature of its composition, and its enormous energy determine the kind of wounds it makes.

In the first place the shape, which

places the center of gravity toward the rear of the bullet, makes it prone to turn, to hurtle thru the air or even to fly butt end foremost. That a bullet which hurtles or strikes sidewise makes a much larger wound and much more extensive lacerations than one which strikes tip foremost is evident. If, on the other hand, the bullets fly straight and especially if they are partly spent and if they strike at long range, they may make a wound which, for military purposes—killing or crippling the enemy—is insufficient. This is notably so with small calibre Italian and Japanese bullets; there are cases of men who have been shot thru the lung and have kept right on fighting, so slight were the effects of the wound. Ammunition of this kind of course, defeats the purpose of war. The shape of the bullet not only determines its flight before it strikes its target, but afterward. At the beginning of the war, there was much talk of dum-dum bullets; one hears less of them as the effects of small calibre ammunition are better understood. Every bullet is a dum-dum bullet—potentially. Any soldier can turn an ordinary bullet into a dum-dum, or the bullet can turn itself into a dum-dum when it strikes. What is a dum-dum? It is a bullet whose tip has been removed or notched or hollowed out or otherwise deformed; so-called because this kind of ammunition was first made in a factory at Dum-Dum, near Calcutta. When a bullet with a split or hollow tip traveling at a high velocity strikes, the air pressure in the tip bursts it asunder, the bullet explodes and works frightful havoc in the tissues. Any ordinary bullet can turn into a dum-dum, or have this explosive effect—either because it has become deformed by some object it hits during its flight—a barbed wire fence or a twig, or because it has hit something inside the body which has the same effect, a hard bone, for instance. So that there is no telling from the nature of a wound whether it was inflicted by a dum-dum or not, and the only reliable evidence on which to base the accusation of using this forbidden ammunition is to capture the unspent ammunition itself.

Of further influence on the character of the wounds is the composition of the bullet, whether soft or hard, solid or of various metals in mechanical combination. The only solid bullet, I said, is the French one of solid copper. This is the most humane, as far as the bullet itself goes. The copper is tough and the French bullet neither splits nor mushrooms nor scatters. It may inflict great lacerations, but they are not caused directly by the bullet, as we shall see later. The bullets of other combatants have a soft core and a hard jacket. If they strike a bone they tend to mushroom; the driving power of the leaden core tears the jacket into strips and it flies on, ripping and rending the tissues. Part of the jacket may stay behind and be spread about along the track of the bullet. There are a few wounds from unjacketed leaden bullets, close range pistol wounds. Here the track of the bullet is also lined with flakes and spots of lead swept off by the tissues.

The shape and composition of small calibre ammunition are of less influence in determining the extent of wounds than its great energy. The weight of the bullets being about the same, energy practically means velocity,—almost a half mile per second at the muzzle of the rifle. It is this that causes the havoc. Things have no time to get out of the way. Much has been written about "explosive effect," much is still unexplained; in many instances tho, the explosive effect is simply secondary to the great velocity of the bullet. A missile flying 5 or 600 yards a second hits a bone and shatters it; each of the fragments then exerts, on the surrounding tissues, the energy imparted to it by the impact of the bullet; each fragment becomes a bullet in itself, becomes a secondary missile;

the tissues, muscle, tendons, skin struck by these fragments impart their energy to other neighboring objects and push and pull and tear on more distant parts to which they are attached; so this play goes on until the whole energy lost by the bullet in its flight thru the body has been used up. How much force is required to break the velocity of such a bullet is

Figure 4.

Short range gun-shot wound, explosive violence. A, wound of entrance. B, wound of exit.

easy to calculate. It is not only the missile therefore, that does the damage. It is what is struck by the missile, the tissues themselves, the bone and the more unyielding soft parts; *they* tear and crush and bruise each other. This explosive effect is exerted mainly at short range; at a distance of several hundred yards bullets no longer seem to have an explosive violence unless they are dum-dums or hit end on or sidewise. Some authors, however, claim to have observed this effect at great distances, and think that there is only a middle zone of distance within which the explosive effect is wanting.

Besides these extensively lacerated wounds, one sees simple ones, a small wound of entrance, a tiny black slit easily overlooked, and a small one of exit, the size of a dime or less and covered with a black scab. Between these two extremes lie all possible degrees of severity. Even in the largest wounds, the wound of entrance is smaller than that of exit, and the track of the bullet has more or less the shape of a cone with the apex towards the entrance.

Figure 5.

Fragment of German hand grenade (above), shrapnel bullets (below).

The machine gun is not, properly speaking, a small arm, but it fires the same ammunition as the hand rifle and makes the same kind of wounds.

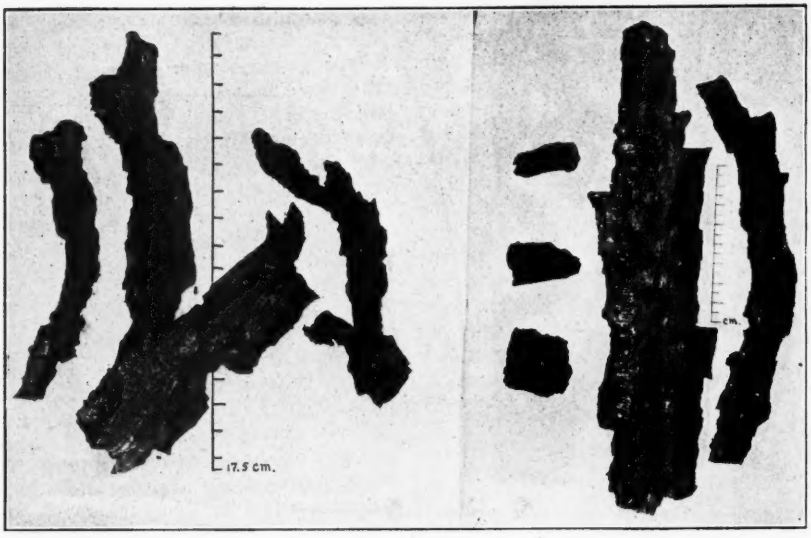
Shrapnel gives a combination of the effects of small calibre ammunition and shell. It consists of several hundred round leaden bullets enclosed together with a quantity of explosive in a steel casing. Attached to the shell is a fuse which is set for time, so that if it fails to explode on impact it does so at the expiration of a certain number of seconds, and scatters the enclosed bullets over a wide area. As the explosive charge acts but momentarily, the shrapnel bullet soon loses its initial velocity and has penetrative power only at close range, i. e., at a short distance from the point where the shell explodes. The leaden bullets are readily distorted

and spattered about in the wounds; one not infrequently finds them split in two.

The typical artillery projectile is the high explosive shell. Originally intended for use in demolishing fortifications, it has attained increasing importance as ammunition to be directed against the living enemy. The shell is of steel, and like shrapnel explodes either on impact or by means of a time fuse, breaking into a multitude of large and small fragments. These pieces are sometimes more or less round or cubical, sometimes long and sharp, but always jagged and irregular. They inflict wounds that are dangerous, not only from the size and irregular shape of the projectile, but from the constant infection. The wound of entry is often smaller than the shell fragments causing it; the elasticity of the skin contracts the wound once the projectile has passed thru. It is not rare to find fragments weighing a pound or more, whole fuse caps for instance, beneath a comparatively small hole in the skin. Both shrapnel and shell fragments frequently lodge in the body, small arm ammunition more often pierces thru and thru.

Besides these three most common forms of missile, small calibre bullets, shrapnel and shell, the war has brought out others, most of them depending on an explosive violence. Among the most common are hand grenades. Where the opposing trenches are close together, 5 or 10 yards, artillery is useless and the explosives are hurled from one side to the other by hand. The French use a grenade which is thrown from a sling; the Germans have two kinds, one a small shot some 3 to 4 inches in diameter, whose steel is divided into 64 squares like a golf ball; this is "put" like a shot. The other kind looks like a tomato can on a stick; it is thrown like a hammer and carries a time fuse which peels off as the grenade leaves the thrower's hand. There

Figure 6.



Fragments of shell.

are also light trench mortars, "mine throwers" which fire a thin shell with a large charge of high explosive for short distances. They are used to shoot up into the air from one trench to the other. Wounds from the explosion of blasts are common, either burns or the result of falling rock, earth and debris. These materials, rocks, flying timbers, etc., which the exploding shell sends into the air, are known as secondary missiles and cause as much damage as the actual shells themselves. Wounds from this kind of explosive ammunition are usually multiple, often badly lacerated and always infected.

Injuries from burns are frequent, produced partly by accident, premature explosion of ammunition, etc., partly by intentional efforts of the enemy. An apparatus is used that throws an intensely hot blast-flame of tar and oxygen for 75 yards. These, then, are the weapons inflicting most of the wounds which we have to consider.

The whole character and nature of the wounds, the whole character and nature of military surgery as distinguished from civil practice is determined by infection; one fact that the present war has served to establish is that all gunshot wounds are infected—all of them. The old dictum that gunshot wounds are sterile unless infected from without, the old theories of the self-sterilization of bullets by heat developed at the moment of impact have been disproven. All gunshot wounds are infected—bacteriologically. Whether the wounded suffer from the clinical signs of sepsis depends upon the local condition of the wound, the amount of necrosis and hemorrhage, the presence of foreign bodies and dead material and the amount and character of bacterial contamination, and further upon the wounded man's general powers of resistance. But, whether infected clinically or not, all gunshot wounds are bacteriologically infected from the start. Clinically they show much variation; whether sepsis develops depends upon local and general conditions; about one-fourth of all rifle wounds, three-fourths of all shrapnel wounds and almost all shell wounds show clinical evidence of infection and suppuration. The cavity of an open fracture containing bits of loose bone, a huge blood-clot, pieces of bruised and necrotic muscle and fat, fragments of shell, the filthy tags of a felt uniform, rocks, earth and all kinds of dirt, will lead to sepsis where the closed clean-cut track of a rifle bullet, a wound whose charred edges seal it off against the rest of the body, will heal as kindly as an aseptic operative incision. About the jaws and face, infection plays less of a part than elsewhere in the body. Wounds of the face are usually wide open, there are no great masses of musculature to confine pus and shut out oxygen. The tissues are well supplied with blood, there is less tendency to necrosis, and these parts are accustomed to fight infection; they are used to the presence of septic organisms. So we saw at the last lecture that some of the most virulent infections, gas-gangrene and malignant edema were unknown about the face and jaws.

To consider then, specifically the injuries of this region. None call for a nicer application of surgical art. Underlying the soft parts of the face are large cavities; if their bony framework is shot away the flesh hangs unsupported as a loose mass of swollen and lacerated tags. As inflammation and swelling recede the flaps shrink into misshapen deformities, caricatures of the human features. The unfortunate wounded are pitied at first, even admired as heroes; they bear their scars with pride; as time goes on romance wears off, and the distorted features of the former hero are looked upon with horror and disgust; he shrinks from public gaze and ends, a recluse from human society. To prevent these deformities it is necessary that the wounded re-

ceive proper treatment early—very early. After the first day the loose flaps begin to swell with inflammation, later they shrink, either makes impossible the proper adjustment of the bony framework or its replacement, if necessary, by prosthetic appliances. The wounded should therefore be taken in hand as soon as possible after injury, before either swelling or shrinkage has begun, and it is greatly to the credit of dental surgeons that they have repeatedly insisted upon the recognition of the evils of delay.

The mortality of wounds of the face and jaws is not great. The principal dangers of gun-shot wounds are two: infection and hemorrhage. Sepsis we have seen, plays no great part in the injuries under consideration; hemorrhage, unless the carotid is wounded, is as a rule easy to staunch. If the carotid is cut, the bleeding is so severe that the wounded rarely reach hospital but usually die in the field. Now and then, however, the internal maxillary or some other large branch is slowly eroded and gives rise to a late hemorrhage so that a typical ligation of the carotid at the front edge of the sterno-cleido-mastoid may be called for. A transverse incision should be made at the level of the hyoid, the skin, superficial fascia and platysma divided, the sheath of the vessels opened, the jugular vein retracted to the outside, the external carotid freed and tied. As a temporary expedient against moderate bleeding from the nose the posterior nares may be plugged by inserting a rubber catheter thru the nostril into the pharynx, drawing it forward out of the mouth, tying a plug of gauze to it with a thread and drawing the plug back into the posterior nares; to try this method with a profuse hemorrhage is, however, to lose time.

Suffocation is another complicating emergency that is occasionally fatal unless quick aid be at hand. If the bony frame of the jaw be broken the asphyxia may be due to a dropping back of the tongue into the gullet. The remedy lies in pulling the tongue forward and keeping it forward by a stitch passed deeply thru its tip. The stitch should be knotted loosely so that it may not cut thru, and may be fastened to a frame placed in front of the mouth. Another cause of asphyxia lies in edema of the glottis, especially with phlegmons of the floor of the mouth. A knife-thrust thru the skin and into the trachea and the insertion of a tube may save the man's life. These complications of injuries to the mouth and jaws are rapidly fatal unless relieved; but death is more frequently due to more slowly acting disturbances of respiration and deglutition. The men have a hard time swallowing; they are often utterly unable to spit out what gathers in their wound-cavities. They gag and choke over their food and aspirate their wound secretions into their lungs; death follows on aspiration-pneumonias, gangrene and abscesses of the lung. As with severe cases of carcinoma of the tongue it may be wise to do a prophylactic tracheotomy and even a gastrostomy; to insert a tube directly into the stomach thru which the wounded may be fed without disturbing the mouth.

If now we consider the injuries of the various regions of the face and jaws we have, as fundamentally different, lesions of the soft parts and of the bone.

Wounds of the soft parts alone are not often severe, except as the result of burns. Burns of the face may have serious sequels. Scars may shrink the eyelids so that the eyes remain uncovered and are made liable to ulcerations of the cornea and suppuration of the tear-ducts. Burns about the alae of the nose may narrow the nostril until nose-breathing is impossible, or may destroy the soft parts of the nose altogether and make the face a hideous mask. Burns of the ears are bad; the skin is thin, the cartilage is often laid bare. Infection follows, the ear swells to a huge size, like a prize-

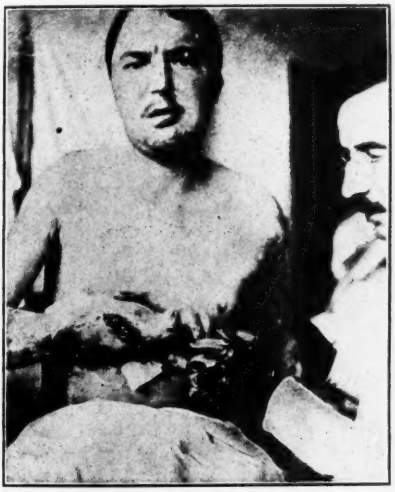
fighter's cauliflower-ear, the cartilage becomes necrotic, swims in pus, and finally after repeated incision of abscesses comes out entirely. Then suppuration ceases. The swelling recedes, and the ear shrivels to a little misshapen button on the side of the head. Burns about the mouth and lips may narrow the mouth so that it cannot be opened enough to admit a teaspoon, more often, however, the opposite effect is produced; the scar everts the lips, especially the lower one, which is most commonly affected. The skin of the chin shrinks, a broad strip of buccal mucosa shows at the lip, the lip is abnormally thick. At times it is so shrunken that the lower incisors show, and there is a constant drooling of saliva.

"Ambrine," the French patent preparation of wax and rosin has been greatly lauded as preventing scar shrinkage. I have had no personal experience with it.

Besides these burns, scars from loss of tissue in the neighborhood or a loss of tissue of the lip itself may pull down the mouth so as to expose the teeth and make what is left of the chin go over directly into the gums. The exposure of the teeth leads to dry and foul mouths and pyorrhea.

Methods for the correction of these deformities we shall discuss next time.

Figure 7.



Extensive burns of face and body from explosion of ammunition. Retraction of lower lip by scar with eversion of oral mucosa. Italian plastic, abdomen to wrist.

Figure 8.

Rifle bullet wound. Entrance at right zygoma, exit at nape of neck.

It is not often that the soft parts are wounded without the bones being injured unless from a shot that just grazes the face. Glancing shots leave a burn rather than a wound, often with a considerable amount of scar and a deep brown pigmentation following. There is, however, one form of penetrating injury that leaves the bone uninjured,—a shot across the mouth and thru the cheeks. The tongue may be shot thru, often it is just grazed; it seems to have a faculty of getting out of the way. It swells greatly, the mouth is sore and the men have difficulty in speaking and swallowing for a week or

two, but the injury heals kindly. A curious form of this wound, puzzling to the uninitiated, is where the wound of exit is on the cheek and just one round wound is visible from the outside. If the man is told to open his mouth another small opening appears on the mucosa of the cheek. One wonders what became of the bullet. Has the fellow swallowed it? No;—he was shot thru the open mouth. The bullet entered the mouth and came out on the outside of the cheek. These wounds are not rare, they occur while the men are storming forward in a charge, yelling.

There remain to be considered the injuries where your dental services are most necessary, wounds of the bones of the face and jaws.

The bones of the face are thin and easily penetrated; a rifle ball will pierce them without shattering them much, but a fragment of shell may smash them out of all human semblance. The cavities of the face are frequently opened. Cracks and defects of the bones of the forehead may lead into and open the frontal sinus; the anterior and lateral wall of the antrum may be shot away, its top may be cracked so as to let the contents of the orbit drop, or the deeper cavities, the sphenoids and ethmoids may be opened. From the frontal sinus of one man I dug out about a teaspoonful of red French earth and rocks, another came into the hospital with a drain the size of your index finger sticking thru his cheek into the antrum, a third had a gunshot wound across the top of his face. About two weeks after injury this man began to complain of a loss of vision. His ethmoids and sphenoids had been opened, and the inflammation had spread to the optic nerve. Still another had a piece of shell traverse his brain and show at the base of the skull with the X-ray. An accurate localization placed it in the ethmoid. I entered the nose at the inner angle of the eye and drew out a fragment of steel the size of a lima bean.

These injuries lie above the level of the teeth; a shot lower down may fracture the maxilla in all possible ways. It may break the palatine plate off horizontally so that it will slide back and forth and sidewise; it may knock out half of the palate, or perhaps only the alveolar plate, it may crack it into small pieces or carry it away in part or as a whole. It is best to mould the fractured bones into shape, if there are any left to mould, as soon as possible. A little anesthetic may be necessary; a quick ether narcosis with the cone is least harmful, altho no anesthetic is good for these men with mouths full of blood and dirt. The fracture may be held by a dental splint or temporarily by placing a wad of cotton under the upper teeth and tying the maxilla firmly into place with a bandage that passes over the top of the head. If the nose is intact gauze may be stuffed firmly into the floor of the nasal cavity. This, however, is a painful procedure and the gauze packing is most uncomfortable. I do not

Figure 9.

X-ray, fragment of shell in cheek.

know enough about the prosthetic treatment of these fractures to discuss them before this society of dentists, but I wish to repeat that obdurators and appliances for correcting deformity of the face and mouth resulting from loss of bone should be inserted promptly after the injury, soon enough to forestall shrinkage, and should put moderate tension upon the cheeks in order to prevent their falling in. Wounds of the outer plate of the maxilla and the antrum make a scar which draws down and everts the lower eyelid when it shrinks, and needs a plastic procedure for its correction.

Fragments of shell and even spent bullets may lodge in the cavities of the face or in the soft parts. Their removal is usually indicated; they tend to keep up suppuration in the sinuses and they are not difficult to extract if properly located by the X-ray. The sinuses are entered by the usual route, the foreign body removed and the cavity drained. If the body is of steel or iron, (a shell fragment), a magnet may greatly facilitate its removal. Sometimes the bullet lodges in the body of the masseter or the pterygoids and keeps up an irritation and trismus until it is extracted; such a case may even be mistaken for tetanus. Extraction of a missile from the masseter is not difficult, but one lodged in the pterygoid may be very hard to get at. It should be accurately located by the X-ray and its position fixed by a needle led down to it under the guidance of a fluoroscope. It may then be withdrawn thru a trans-oral incision. The neighborhood of the internal maxillary makes the work risky; incision from the outside in back of the jaw is dangerous to the facial nerve.

Gunshot wounds of the mandible are quite different to those of the other bones. The jaw bone is denser and harder, it is more loosely articulated and more freely movable than the rest, and its fractures are always infected. It is so dense that it is usually completely shattered or torn away if struck squarely by a bullet; instances where it is simply pierced by a long-range rifle shot are quite exceptional. Its hardness makes it break into numerous chips; it lies closely to the skin and if the chips are carried away by the force of the bullet great pieces of the soft parts are carried away with them and a vast defect is left. The whole chin, floor of the mouth and tongue may be torn away, and in the defect the open pharynx and a hopeless confusion of torn and mangled muscles be visible. The hemorrhage may not be great; an artery that is torn off does not bleed like one that is cut. Much loss of tissue and large defects in the soft parts of the mouth ensue even when the jaw bone is not shattered squarely across but only one-half of it is affected. An almost spent bullet, or a fragment of shell or shrapnel may of course, merely break the jaw from the force of its blow without shattering it, and make a fracture like those encountered in civil practice.

The condition of a man with a defect of the mandible like that described is deplorable. His cheeks soon swell enormously, he drools blood and saliva from his cavernous mouth, he cannot swallow foods or liquids, he cannot talk, the injuries are exceedingly painful. Fortunately most of these wounded, unless they have some complicating injury to the skull, are able to walk.

The rule for their treatment at the front is to get rid of them quickly; to evacuate them as soon as possible. They belong in a base or a home hospital under competent dental care. First treatment consists in cleaning the wound, which is usually wide open, of foreign material and dirt by irrigation with warm water or salt solution or boric acid. No bone should be removed unless it is entirely detached. If it hangs by even the loosest shred of periosteum, it should be kept. A part of it may become necrotic and be shed, most of it will live

and remain; it is surprising how little of an apparently loose piece of bone is lost —often nothing more than a thin flake from the exposed surface. A dental splint or some other fixation apparatus should keep the fragments in place. Captain Marshall will discuss this in a subsequent lecture. If trained dental help cannot be secured, the lower teeth may be wired to the upper ones.

It may be well to treat these fractures on the principle that joints should be treated in that position which is subsequently the most difficult to attain. Muscular contractures and trismus may be forestalled, therefore, by treating the fracture with the mouth open.

The soft parts should be as carefully preserved as the bone. They are well nourished, necrosis and sloughing are usually inconsiderable, and all that we can save is of value in getting a covering for the mouth and saving material for future plastics. Loose flaps and tabs may be stitched into place by one or two sutures or held by a piece of plaster. The wound should never be tightly closed nor even accurately approximated. The secretions should flow out freely. One should be especially sparing of the mucosa of the mouth; wherever possible it should be laid between the bone and the cheek in order to keep as much as one can of the buccal fold, whose preservation is the best means of preventing shrinkage and of keeping the soft parts loose from the bone for use in future plastics.

The men should be fed thru a tube. This may be introduced into the gullet or stomach thru the nose; a better way is to give the man a nozzle cup with 10 or 12 inches of soft rubber tubing attached to the nozzle. By patient trial and with the aid and encouragement of a good nurse or surgeon he will soon learn to lead the tube into the esophagus thru the wound and to let fluids trickle down into the stomach if he cannot be made to swallow them actively. A nourishing mixture consists of a pint of milk, a tablespoonful of butter, one of sugar, two eggs, an ounce of whiskey and a pinch of salt warmed slightly and mixed, not beaten or whipped. After taking this mixture the mouth should be irrigated with water in order to clean it of milk, which curdles and sours in the wound. Long continuous irrigation with warm salt solution helps to keep the wound clean afterward. Sepsis, osteomyelitis of the jaw, phlegmon of the submaxillary space or of the neck may follow—sequels which we discussed last time. They are rare, rarer than one would think, judging from the irregular surface and infection of the wound.

Injuries of the face and jaws are not to be counted among the gravest of war, but there are none that better reward proper treatment and none that more heavily avenge neglect. If the face is allowed to collapse, and the defects in the chin to shrink the resulting deformity is most difficult to correct; ankylosis of the jaws, retreating chins, misshapen dentures are conditions whose relief I hope to be able to discuss before you next week.

OUTLINE OF LECTURE ON GUNSHOT FRACTURES OF THE JAWS AND THEIR TREATMENT.

By John S. Marshall, M. D., Sc. D., F. A. C. S.
Captain U. S. Army, (Retired) Berkeley, Cal.

(Read before the Preparedness League of American Dentists, San Francisco, Cal.)

FRACTURES of the Jaws. By the term *fracture* is meant a break in the continuity of the bone.

Fractures of the bones of the body are of common occurrence and make up a very considerable portion of the practice of the general surgeon. Inasmuch as the change in the title of our lecture confines us to "Gunshot Fractures of the Jaws" we shall have very little to say about fractures of the jaws as seen in Civil Life.

In peace times fractures of the jaws in our Army, follow very closely the percentages recorded in civil life.

The lower jaw or mandible on account of its more exposed position and its peculiar shape is much more liable to injury from accidents than is the upper part of the face.

Fractures of the Jaws are quite common in our Army even during times of peace. These injuries generally result from blows upon the face from the closed fist; kicks of horse or mule; the impact of some heavy missile propelled with considerable force; the extraction of teeth, tho this is rare; a fall from a horse, bicycle, or a gun-carriage; the passage of a wheel over the face; and gunshot injury in line of duty or from accident, or design, with suicidal intent or otherwise.

Gunshot Fractures, except in time of war are very rare. The army dental surgeon might serve for ten years without seeing a single case of this character.

In times of war, however, the circumstances would be very different and it might be his fortune, and probably would be, to see many such cases during the period of his service.

Trench warfare and the increased use of Shrapnel has greatly augmented the number of wounds of the head, face and upper portion of the body, while it has greatly decreased the number of wounds of the trunk and lower limbs. Severe wounds of the head, face and neck are very apt to prove fatal from injury to the brain or the large blood-vessels.

The Face Wounds which escape an immediate termination are usually those made by the jacketed bullet portions of shrapnel or fragments of shell, which tear away the soft tissues and underlying bone, leaving a hideous and ghastly wound.

Injury to the *bone* from these missiles is often very great, smashing and comminuting it to such an extent that it seems practically impossible to restore the normal contour of the injured part, and yet some of our English, French, German and American confreres have been able, by their superior skill and scientific technic to accomplish results that are well nigh miraculous.

The Oral Surgeon has during this World War come into his own. He is now recognized as an indispensable

member of the Surgical Staff of every well organized Civil, and Military Hospital.

Because of the achievements of our confrerers upon the other side of the Atlantic, much, very much, will be expected and required of *us.* Can we arise to the occasion? Surely we *can;* and *we must.*

There is a possibility that this war may go on for another two or three years, and if this be true, there will be great need for skillful oral surgeons and very many of them.

It is your duty to prepare yourselves to meet this emergency when it shall come.

What I shall say to you this evening will be a mere outline of the subject before us. More than this time will not permit.

The subject matter as laid down in the printed programme is so comprehensive that it would require at least *three lectures* to cover it, and that only in a superficial manner.

Fractures of the Maxillary Bones are classified under two general forms; namely, *Simple* and *Complicated.*

A Simple Fracture is one in which there is a single break in the bone, without laceration of the external tissues.

Complicated Fractures include all other conditions associated with a fracture of a bone such as injuries to the external tissues, to vessels, nerves, teeth, a comminuted condition of the bone itself, or any other condition which complicates a simple fracture.

Complicated Fractures may be divided into *Multiple, Comminuted* and *Compound.*

Multiple Fractures are those which have more than one break in the continuity of the bones.

Comminuted Fractures are the result of crushing injuries, or gunshot wounds, which crush and splinter the bone into minute fragments.

Compound Fractures are those which have associated with them injuries to the soft tissues, causing exposure of the fractured bone.

The last two forms are those most often seen in Military Surgery and will be the only forms discussed this evening.

The military oral surgeon will, however, be often called upon to treat fractures of the jaws which are not the result of gunshot injuries, consequently every form of fracture from the simplest to the most complex will be presented for treatment.

All *gunshot fractures* of the jaws belong to, and come within the two last mentioned groups, namely: *Compound* and *Comminuted Fractures.*

Fractures of this character are almost invariably infected from the moment of the injury; either from the *missile itself,* the septic condition of the *skin,* portions of which are carried into the deeper tissues of the wound, or the septic condition of the *mouth* and the *accessory sinuses.*

In *Comminuted Fractures* of the Jaws, fragments of the *bone* and of *teeth* are often carried into the tissues for a considerable distance where they by reason of their septic condition, establish many separate foci of infection.

These conditions greatly complicate the case and render the treatment difficult and hazardous. Another, immediate and often dangerous complication, is hemorrhage and this may call for the ligation of the external carotid artery, if the patient's life is to be saved.

Secondary Hemorrhage is sometimes a serious complication and calls for prompt action for its control.

Sepsis and *Hemorrhage* are the two most serious complications that must be combatted.

Primary Hemorrhage, that which occurs immediately after the injury, if it does not at once prove fatal is usually treated by the surgeons upon the *firing line.*

Secondary Hemorrhage usually de-

velopes in from forty-eight hours to two weeks after the injury has been inflicted.

There is still another serious complication that sometimes developes, namely, *gangrene.*

This condition is largely due to the smashing effect of the missile upon the soft tissues, which kills them outright; to the interruption of the circulation thru the severing or ligation of important blood-vessels that supply the part; or to infection with the gas producing organism *bacillus welchii* of gas gangrene, (emphysematous gangrene).

This form of gangrene was little known until the present World War. It is a septic condition induced by the above named micro-organism, acting upon injured, or dead and dying tissues. Because of the fact that gas gangrene is one of the most serious of all wound complications, it may not be out of place at this time to say a few words about the organism that causes the disease.

This organism like that of tetanus (lock-jaw) is an *anaerobic* bacillus, and grows and flourishes without the presence of oxygen. It is found in the intestinal tract of the higher animals, in garden soil, street dust, sewage, river water, and milk, but it is most abundant in *soil.*

Its action after entering a wound is to produce necrosis of the soft tissues, followed by liquifaction and putrifaction of the tissue elements, with the evolution of gas.

It is most often found associated with injuries to the bone. *Compound and Comminuted Fractures.*

Wounds infected with this organism have been very common among the soldiers from the battle-fields of Northern France. This form of infection has given the surgeons at the front, and also at the base hospitals in France, Germany and in England a great deal of trouble and much anxiety.

A little over a year ago, in a communication received from an English Surgeon, he stated "nearly all of the cases that are sent home from France are in a septic condition, many of them gangrenous, and not a few of these, but many, are due to the presence of the gas bacillus."

Infection with this particular micro-organism has been thought by some authorities to be due to its presence in the soil of the land over which the opposing armies have been contending. Northern France, and in fact the whole area of battle-scarred France and Belgium have been for generations subjected to the highest forms of cultivation and fertilization, consequently the soil is filled with many forms of bacteria that are dangerous to the health and the life of man if by chance they gain an entrance to his body, not the least of which are the *tetanus bacillus* and the *gas bacillus.*

Tetanus antitoxin is used in large quantities at the dressing stations and the field hospitals as a preventive measure against tetanus, and it is due to this fact that so few cases of this disease have developed during these later months of the war.

For the proper presentation of my subject it will be necessary to slightly change the order of the subsections as laid down in the printed program and add some others. Shock for instance is not mentioned and this is important.

A—*Surgical Treatment.*

Shock if present, is the first condition that needs attention. Operation should be deferred, except for hemorrhage, until the patient rallies from the condition of shock.

1.—Shock is a condition of sudden depression of the functions of the whole body, due to powerful impressions upon the system by physical injury or mental emotion.

The symptoms or manifestations, are signs of lowered activity of the cardiac, respiratory, and sensorial functions, and reduction of surface temperature. The depression of the vital forces corre-

sponds to the severity of the injury and the impression made upon the nerve-centers. The tendency is generally towards reaction which may take place in a few minutes or be delayed for several hours or in very severe cases it may never be established and the case terminate fatally.

The prognosis of shock is considered unfavorable if reaction does not set in within eighteen to twenty-four hours, or if the body temperature falls below 96° F. A surgical operation under such conditions is absolutely contra-indicated.

Other unfavorable symptoms are loss of power of swallowing, loss of sensation in the conjunctiva, persistent vomiting, and relaxation of the sphincter muscles, inducing involuntary evacuation of the bladder and of the bowels.

The Treatment of Shock. In mild cases of shock very little in the line of treatment is required beyond that of keeping the patient *warm* and *quiet.* The application of artificial heat by means of hot-water bags, hot-sand bags, or hot bricks, so protected as not to burn the patient, is of great value in restoring the equilibrium of the circulation and the nervous forces. Stimulants and other drugs are not indicated, except in severe cases, as they have a tendency, by increasing the blood-pressure and heart action, to reestablish or increase hemorrhage.

Always place a patient suffering from shock, in the prone position, upon the back and when the heart action is much depressed, the foot of the bed should be elevated so as to bring the head lowest, that all unnecessary labor upon the heart may be removed and the least possible amount of energy expended in forcing the blood to the exhausted vital nerve-centers.

If the shock is due to loss of blood it may be necessary to employ normal salt solution by subcutaneous injection or the transfusion of blood by the veines.

2.—*Sepsis and Antisepsis.* As a rule, all battle injuries are septic from the moment of their infliction, as already stated.

Such injuries or wounds, however, should be immediately protected from further infection by the employment of the contents of the first aid package found in every soldier's kit. All handling of the wound as in attempts to cleanse it only increase the dangers from further infection.

Wounds of the face and jaws, by reason of these parts as a rule remaining uncovered, are not so often infected by portions of clothing, as are wounds made upon portions of the covered body.

In any event the wound must first be exposed, but not touched by the hands, or washed, as these efforts at cleansing only increase the dangers from infection.

The *first aid package* is sterile *and* contains two bandages and a small con-container of Tincture of Iodine for disinfection.

The long bandage with the compress sewed upon it, at the middle, is for protecting a wound of the face, trunk, or extremeties; the other is what is known as a handkerchief bandage and may be employed as a sling or for covering a wound of the head.

After a wound has been uncovered the tincture of iodine is poured into it and the bandage immediately applied. This gives the necessary protection until the wounded individual can be removed to the *dressing station.*

At the *dressing station* the case receives such other attention as the conditions demand and he receives a dose of tetanus antitoxin. As soon as it is safe to move him he is forwarded by Ambulance to the Field Hospital, where a careful and painstaking examination is made and recorded, and further treatment instituted against the development of tetanus.

Only emergency operations are performed at the Field Hospitals.

As rapidly as the conditions of the patients will permit and the circumstances of transport allow, they are forwarded to the Base Hospitals for further treatment and necessary operations.

The Oral Surgeons are usually stationed at the Base Hospitals, and consequently rarely see the cases of Fracture of the Jaws, until several days after the infliction of the injury and suppuration has generally been well established.

Very few cases of Compound fracture of the jaw in Civil practice escape suppuration, and practically none in Military practice.

Gunshot Fractures of the Jaws usually involve a more or less extensive destruction and loss of bone and teeth. Occasionally only the teeth and a portion of the supporting alveolar process will be carried away; while in another case not only the teeth and a portion of the alveolar process, but a considerable section of the body of the bone is comminuted and lost.

Injuries which carry away large sections of the maxillary bones are very serious and as a rule cause great facial deformity.

Inasmuch as this lecture is supposed to deal with those fractures of the jaws which are caused by *gun-shot injuries* or in other words war injuries, we shall not attempt to deal with those less serious fractures of the jaws due to accidents not associated with the use of fire-arms and which make up the bulk of jaw injuries as seen in civil practice.

Gunshot Fractures of the Jaws and Bones of the Face make up a very considerable part of the wounds found assembled in the European Base Hospitals and for this reason the services of trained oral and dental surgeon have been in great demand. The former for his superior skill and knowledge in treating mouth and jaw injuries, and the latter for his no less great skill and technic in the construction of splints and artificial appliances to take the place of those structures which have been destroyed and carried away.

The cooperation of the general surgeon, the oral specialist and the dentist, have thru this team-work accomplished many things that seem little less than miraculous if we may believe the reports that have been published from time to time in our periodical literature. Some of us might be inclined to doubt these statements, if it were not for the oral testimony of some of our confrerers who have been eye-witnesses of these marvels.

Symptoms of Gunshot Fractures. The symptoms of this class of injuries are so plain that "he that runs may read." An open wound of the face, and deformity in symmetry and contour, are sufficient to indicate the nature of the injury. No two cases are ever likely to present the same characteristics, or require identical treatment. Hence there must be a never ending interest in the subject, and a variety of studies presented, which will tax the skill and inventive resources of the various numbers of the staff to their full limit.

The opportunities for growth and development along these special lines has never been surpassed in the history of the world.

It is of course necessary to examine the wound that a proper diagnosis may be made, but let the examination be as free from traumatisms as possible. Let there be no unnecessary probing or manipulation of the tissues as this increases the liability to further infection.

All loose pieces of bone, or fragments of clothing or of the missile causing the injury,—and this may be portions of a bullet, of Shrapnel, of shell, of wood, or portions of accounterments of the victim or of a comrade—should be removed.

Pieces of bone, however, having periosteal attachments should be allowed to remain, as the chances are that they will form the nucleus for the regeneration of bone.

A fragment of bone with a vital attachment to the periosteum is superior to a bone graft even under the most favorable circumstances. Much harm is often occasioned by the misdirected, over-zealous efforts of some young enthusiastic surgeon, along the line of cleaning out the wound by the removal of fragments of bone.

Much serious deformity might be avoided if small fragments of attached bone were allowed to remain.

It is surprising to see how readily these little pieces will unite and form a considerable plate of bone. This is particularly noticed in the external wall of the frontal sinus, the maxillary sinus and of the bones of the nose.

My advice along this line is *never remove any fragment of bone that has a vital connection with the periosteum.*

These fragments if depressed as in the regions just mentioned may be manipulated into place with proper instruments and moulded into position, and thus reduce the liability to a more or less serious deformity.

SETTING FRACTURES OF THE JAWS.

As was said on a previous page, "no two fractures caused by gunshot injury ever present the same characteristics or require identical treatment" consequently each case must be treated according to its individual requirements.

For instance, an injury involving the loss of the crowns of several teeth and a portion of the alveolar process, with a simple fracture of the body of the jaw, would require a much more simple method of treatment than would an injury which carried away a large section of the jaw upon one or both sides. The former might be treated, if it occurred in the anterior portion of the jaw, by an external splint and a four-tailed bandage; while that involving a loss of bone upon one side of the jaw might be very satisfactorily treated by wiring the jaws together in a normal occlusion, and later constructing a bridge of porcelain and one of the precious metals to replace the lost tissues. An injury involving the loss of a portion of the body of the jaw upon both sides would not only be a serious wound, but a very difficult one to treat particularly so if associated with the lower jaw. Hemorrhage might prove a serious complication, and greatly retard any efforts made to place the jaw in a relatively normal position. This may be accomplished temporarily by the aid of an external splint and bandages. Swelling of the soft parts would in all probability be very considerable, rendering it well-nigh impossible to operate in any form for several days. In these cases salivation is very great, and the taking of food out of the question without the aid of the stomach tube.

The efforts of the surgeon in these cases is primarily addressed to relieving the pain, to reducing the swelling, and combating the infection. As soon as the swelling has been reduced and the infection overcome, operative procedures may be undertaken.

Treatment. The treatment of a case of this character would naturally require team-work such as we spoke of a few moments ago; work that would call for the highest degree of technical skill upon the part of all parties engaged.

We take it for granted that there is only one method of restoring a jaw to usefulness that has been so seriously injured as the one under discussion, and that would be by *bone grafting.*

An operation of this character, presenting as it would, so many difficulties and possible discouragements, would involve an immense amount of preliminary preparations before the surgical treatment could be undertaken. First, it would be necessary to take impressions of both jaws. From these, models should be made with Plaster of Paris. There would be considerable difficulty in securing suitable impressions of the lower jaw for in all probability it would

be necessary to take it in sections and then after models were made, to reconstruct these using the model of the upper jaw as a guide for the proper occlusion of the teeth.

Upon these reconstructed models it would be necessary to construct an interdental splint that would hold the anterior and posterior fragments of the jaw in their relatively normal position, during such time as would be required for the grafted bone to unite with the anterior and posterior fragments.

The construction and insertion of the interdental splint should not be delayed beyond the arrest of suppuration and the healing of the traumatisms within the mouth, as it not infrequently happens that undesirable adhesions are formed which may require operation to overcome.

The treatment by bone grafting would require many weeks and perhaps months to accomplish a successful result and during all of this time there would be the constant liability to loss of the graft from necrosis of infection or of both.

An interdental splint such as would be required in a case of this character would have to be so constructed that it could be kept clean by irrigation. This can be easily accomplished by drilling numerous holes in the splint opposite the individual teeth.

(Various splints were exhibited that had been used in practical cases).

The form of splint required for a case like the one under discussion should cover all the teeth in both jaws. It would also be necessary to mould an external splint to the lower jaw extending from angle to angle as an added support to the jaw.

The head should now be shaved, the interdental splint placed in position, the external splint for the lower jaw applied, the mouth firmly closed by upward pressure upon the external splint and the jaws so held together by adhesive strips passed under the chin and over the crown of the head.

This forms an immovable appliance that can be kept clean and that will hold the parts in their normal position, thus preventing undesirable adhesions and will maintain the fragments of the lower jaw in admirable position for the operation of bone grafting and during the process of union between the graft and fragments of the jaw.

No grafting of bone should be undertaken while there is any sign of suppuration within the mouth or elsewhere for reasons that are obvious.

Grafting of bone would have to be done thru external incisions and these should be so placed as to prevent an unsightly scar. Care must be taken not to enter the oral cavity as infection would be fatal to the graft. The bone for the graft is best taken from the patient himself.

There are two methods of making bone grafts in the mandible. The most reliable method is to cut a section of bone from the jaw itself long enough to fill the gap, leaving the fragment attached to its periosteum and over lying tissues, sliding it into place and retaining it in position either with silver wire structures or bone dowels. This preserves the blood-supply of the graft and greatly increases the chances of a successful operation. It is not essential that the bulk (the gross bulk) of the graft be as great as the portion of the jaw that has been lost, for a very small piece, if it fills the gap, will form its environment and the stimulation of use, soon attain a size commensurate with the normal requirements of the jaw.

The other method is to transplant a section of bone from a rib or from the anterior portion of the tibia. Be sure at all times to leave the periosteal covering of the bone intact.

The transplanted bone must be of such length as will fill the gap and it

must be secured in position by means of the wire suture or the bone dowels.

In this operation there is a fair chance that a sufficient re-establishment of the blood circulation will take place between the graft and the tissues into which it is transplanted, and that union will take place between the graft and the fragments of the jaw.

Dr. Murphy was of the opinion that the transplanted bone, as such, never united with the living bone of the part, but that it simply acted as a bridge, framework or scaffolding for the regeneration or formation of new bone, and that finally this bridge or scaffolding was removed by a process of resorption as the new bone was formed. It was also his opinion that the periosteum was not so essential to bone regeneration as some authorities had maintained, but that the medullary tissue was the active agent in the formation of new bone.

From several X-ray pictures shown me by Dr. Murphy of cases which he had under treatment at the Mercy Hospital, I am inclined to believe this is the true explanation of the manner in which nature performs this marvelous service.

Clinical experience also seems to point in this direction, as for instance in certain compound fractures of the mandible with loss of considerable sections of the bone by necrosis, it not infrequently happens that this lost tissue is replaced by new bone. And I have also seen the same phenomenon take place in gunshot fractures of the jaw, where quite extensive portions of the bone have been completely carried away. The filling up of the gap seemingly by growth of new bone from the ends of the fracture.

I have known of one case, a Fillipino boy 16 years of age, in which a gap of a full inch was filled in, in this way, and five years afterwards defied detection, except as shown by the absence of certain belonging to this region.

Of course all surgery of this character, must be performed under the very strictest aseptic methods, from beginning to end.

Your essayist has had some little experience in the treatment of gunshot fractures of the Jaws, and also with bone grafting, hence speaks from knowledge of the difficulties to be overcome.

It was my privilege to make my first bone grafting operation upon a lower jaw for a woman (in January 1887) who had eight years previously lost a large section of the right half of the jaw in the removal of a malignant growth. This operation of bone grafting was performed at the Mercy Hospital in Chicago where the late lamented Dr. John B. Murphy, so recently made such a brilliant record in bone-graft surgery.

REPAIRING SOFT TISSUES.

The terrible deformities of the face and jaws occasioned by the modern weapons of warfare has stimulated the ingenuity and artistic taste and ability of the modern surgeon to such a degree that it is now well-nigh possible to reconstruct the features of the individual to such an extent as to almost make a new face, and sometimes even to improve upon the original itself.

At the beginning of this World War *Plastic Surgery* had not been very highly developed and there were very few surgeons capable of handling these cases with any great degree of efficiency. The *necessity,* however, of doing something to relieve the great depression of mind of these poor fellows occasioned by these ghastly deformities was the chief stimulus to the intellect and heart of the surgeon. Out of this necessity has developed the most wonderful skill and technic in plastic surgery that the world has ever seen or is even likely to see again.

The extent and severity of the injuries to the face and jaws is often very great.

It not infrequently happens that a considerable portion of the cheeks, lips or nose may be badly torn or completely carried away leaving an unsightly, re-

volting deformity that can only be remedied by a masterful plastic operation.

One of the chief difficulties that the surgeon has to encounter is to obtain the tissue with which to close the gap. Ordinary skin grafting is not always suitable as for instance in restoring a nose, in building a new lip or filling a large perforation in a cheek. In these cases tissue *en masse* must be transplanted. Such tissue must come from a location near the seat of the injury, as during the healing in of the transplanted tissue it must maintain a vital circulatory connection at its base, otherwise the tissue will die and slough out.

Dr. Carrel's experiments—now interrupted by his service in France—gave great promise of his being able to keep alive certain tissues for a more or less indefinite period, and of actually transplanting them from one organism to another. Whether this will ever be accomplished in a practical manner we do not know, but the Good Book tells us that if we "have faith as a grain of mustard seed we must say to yon mountain be ye removed into the sea and it will be done." What appears today to be a miracle is tomorrow a common place phenomenon. Let us therefore have faith.

Twenty-five to fifty years ago great dependence was placed upon mechanical appliances as substitutes for lost portions of the face and mouth as for instance artificial noses, artificial palates, artificial jaws, etc.

Today the surgeon restores the nose by a plastic operation. He also closes a perforation in the hard palate caused by specific disease or a gunshot injury by the same means; while loss of bone tissue in the jaw or the mandible is replaced by a bone graft, which after a few months is so completely restored that it is difficult for the uninitiated to detect it, or to believe that such a serious injury had ever been inflicted, or an operation of such magnitude had ever been performed.

We are only just upon the threshold of a great and marvelous new era in surgery, an era that will be as wonderful and as full of possibilities as that which followed the discoveries of anesthesia and of antiseptics. What a supreme and exalted privilege it is, and will be, to live in such an age, and add our mite, no matter how small it may be to the furtherance of such a glorious epoch.

Do we realize our high privilege?

Are we as practitioners of dental and oral surgery ready and willing to assume the responsibilities of this high privilege and take the place in the great profession of the Healing Art, that circumstances has opened to us? I trust and believe that we are and now that the time for action is upon us, let us take our place and fulfill our obligations to the best of our ability. Knowing that "of him who has received much, much will be required."

MOUTH INFECTION WITH CAUSES AND TREATMENT FOR PERIAPICAL ABSCESSES.

By Carl J. Grove, Ph. G., D. D. S., St. Paul, Minn.

(Read before the Washington State Dental Society.)

THE abundance of evidence already presented establishes beyond question that the effects resulting from peridental infections are from a low grade of toxema to actual illness, and not a few succumb to the diseases resulting from these foci.

The etiology of many lesions can now be satisfactorily explained on the basis of the presence of these suppurations. It is frankly admitted by leading surgeons as well as internists that the removal of these infections is a prophylactic measure which should not be lightly regarded. I fear, however, many do not realize fully the importance of thoroly removing all the infections present in the mouth. The thought which seems to prevail is that if one or two infected teeth are found when a manifestation of secondary infections appear, that the whole cause has been discovered. This is a most serious mistake which is made too frequently by both dentists and medical men. If satisfactory results in the treatment of secondary infections are to be obtained, the importance of thoroness in the investigation cannot be too strongly emphasized.

It is a matter of great interest that the presence of pus is not essential to the production of these lesions, altho it is generally believed that the presence of pus is required to produce systemic disturbances. This belief is perhaps due to the fact that suppuration usually accompanies these conditions. This is, however, only a coincidence. It is known that when streptococcus is isolated from an infected gall bladder and introduced into the blood stream of animals, a typical cholocystitus will be produced in a large per cent. of these experiments. And the same is true of appendicitis where streptococcus is isolated from such lesions and injected into the circulation. In these cases no pus is introduced, but the secondary infections are produced by the injection of only streptococcus.

We are told that appendicitis cannot be produced by injecting the organism into the portal circulation, but only by injecting them into the general circulation. It is, no doubt, a fact that appendicitis is not so often produced by infections traveling from the bowels as from the micro-organisms existing in the blood stream. It should be remembered, therefore, that such infections may arise from focus in any part of the body. I am convinced that root abscesses are frequently the direct cause for such lesions.

If it is true that appendicitis results from infections of this nature, it is, no doubt, true of other infectious diseases. In fact it has been most conclusively proven by Rosenow's experiments. The percentage of those with focal infections who escape systemic disturbances where they have been present for any length of time, is, I believe, very small, altho some of these manifestations are

not recognized until the secondary lesion has become very pronounced.

Many diseases which were lacking a satisfactory explanation as to their etiology are now proven to be produced by the existence of a focus in the body. I believe that many of the afflictions of mankind which today baffle the physicians will prove to be of such origin.

In the light of the knowledge we possess regarding the effects following the presence of focal infections, no one should fail to recognize the importance of these findings. If dentists will avail themselves of the opportunities which present themselves to us daily, they will, thru the benefits derived by such labors, place the dental profession upon a plane as being the grandest and most noble of all professions.

To accomplish this we must acquire a better knowledge of pathology, anatomy, chemistry and all the various subjects dealing with the complex make-up of the body. It will not be enough that we learn what is contained in the books upon these various subjects, but we must be able to apply this knowledge to the new conception of these lesions. There is no grander and more needy work in our profession which is only a duty to be evolved by us. The responsibility one assumes when deciding upon the method of procedure when such cases are presented for treatment is vastly greater than was formerly believed. Upon this course rests the status of the health of these patients.

If you will allow me to cite only a few cases that have come under my care that those who may be skeptical about the results obtained will gain a better conception of the importance of this work. In the month of August of last year, a lady about fifty years of age called to see me regarding the condition of her teeth before leaving the city in search of health. The change was recommended by her physician, who is one of the leading men of our city, under whose care she had been for some time. She was advised to go to the northern part of our state and remain for a while with the belief that the change would be beneficial.

She gave me the history of her condition, which was, briefly stating, such as we all have often heard of, in a badly run-down condition, anemic, subject to fainting, and a case where one would be suspicious of tuberculosis from her appearance. In the morning she would always drink a cup of strong coffee as a stimulant before engaging in her household duties.

From similar past experience, I at once became suspicious of infections, and informed her that it would first be necessary to have some X-ray pictures. After obtaining the pictures and finding some very badly infected areas, I conferred with her physician about the removal of these infections.

In operating a very bad condition in the upper anterior portion of the mouth was found the infection involved the antrum as well as some molar roots, which were extracted. This patient is at the present writing, and has been for some months, using her own expression, "perfectly fine," and as she has said, she never has to think of herself any more. She has also increased in weight, altho she did not take the trip suggested by her physician. I do not believe hospital treatment is absolutely essential in these cases, but I do know where the patients have a severe case of toxemia that the recovery is more rapid where a complete rest and proper care is given.

I would like to cite two or three more cases. A lady suffering from tabies, which as all know, is a syphilitic condition. The patient suffered intensely with what is called "lightning pains" thruout her body. The ordinary method for this lesion was prescribed by the physician in charge, with some benefit, but the case became very obstinate. The lady suffered intensely at times. I was

called to see the case and found a badly infected mouth. All of the teeth were extracted with a thoro curettement. In about five weeks' time the lady was almost relieved of her pains except occasional slight pains. She left the hospital in a very comfortable condition. I have had other cases of this nature which yielded nicely to the same treatment, but the treating of the teeth alone would not be sufficient in such cases. The physician and dentist must work together in such cases as well as many other conditions of this nature.

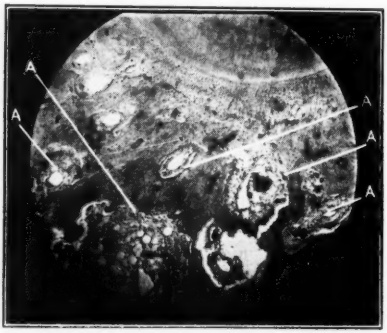


Figure 1.

Another case was that of a young lady who was obliged to give up her position in school work more than a year ago on account of arthritis. Her tonsils were removed with some temporary improvement. Her teeth were then rayed at various times by different men always with negative findings. After a careful examination clinically and of the radiographs, the upper left lateral and two upper right bicuspids were found to be abscessed. These were, however, very small. Three weeks after the operation the lady was greatly improved, and after a period of eight weeks, was suffering only with occasional slight pains. This case is of special interest because it proves the importance of removing infections which may appear to be very small; in fact such findings are believed by some men not to be infections. It is not possible for me to enter into detail of these cases as I should like to do. The eradication of mouth infection in cases of insomnia has been most gratifying as well as in nervous and mental diseases.

I would like to call attention to a few important points regarding these operations and what is said of these cases applies to all chronic abscesses. I would like to have you gain a clear idea of the histological structure of the bone surrounding the roots of teeth. Figure 1 illustrates very clearly the character of these tissues. It will be seen that these tissues are well supplied with medulla at (a) and the bone surrounding the medulla is rather thin and not very compact, or somewhat cancellous. It can be seen that if infections enter any portion of the medulla the resistence to the inroad of inflammation will not be very great, and where pressure such as there would be from the accumulation of fluids in an infected area, the fluids present would be forced far into the medulla, perhaps in all directions, and as the products resulting from the breaking down of tissue would be filled with bacteria, infection of the whole medulla may follow. These conditions are not always perceptible in a radiograph, but exist in many of these infected areas.

If a close observation is made in cases of root amputation this will be noted. It is absolutely essential that all the infected sinuses extending into the medullary cavity are removed. The removal of all the infected or necrotic tissue surrounding the rarified area is just as essential as the removal of any part of the infection. I have known cases where a failure to relieve systemic disturbances was due to the oversight of the existence of such a condition or at least to a failure in removing it. A surgeon would not treat osteo-myelitis or any bone infection by merely making an opening for drainage. He would always remove

the necrotic bone. If we extract a tooth and do not remove the necrotic bone existing in many of these cases, we merely make an opening for drainage and rely upon nature to take care of the dead tissues. It is true that nature often does care for this, but it is not good surgery to knowingly allow such a condition to remain upon the supposition that it will take care of itself.

We have in the past relied upon medication for the cure of these conditions, but investigations show very clearly, I believe, that this method should be abandoned and surgery employed. I realize fully that the views I am presenting are not altogether orthodox and some of you may be inclined to believe that this teaching is incorrect. I wish to say, while this is not a method that most dentists employ, it is at least correct from a pathological standpoint, and is the only method by which permanent results can be obtained in the treatment of systemic disorders where these lesions are caused by periapical infections.

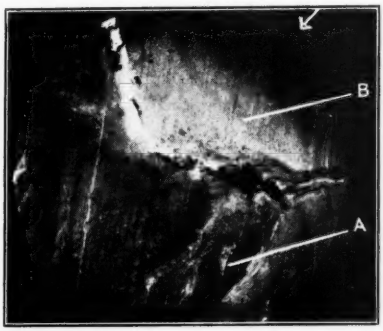


Figure 2.

I will show in the next slide what the pathological condition of periapical tissue is in these cases. To expect permanent results by medication in these cases to me appears absurd. At one time I was under the impression that I cured abscesses by medication as many dentists do today, but after some careful investigations of these treated teeth, I found that it had not been done. Figure 2 is a photomicrograph of a root pronounced cured and a crown was placed upon it (A) is the granuloma and (b) is the root. The portion of the root involved by the abscess is denuded of its membrane.

All must realize what the condition is after the peridental membrane and the cement corpuscles have been destroyed. A new membrane will not form in such cases. It can be seen that only the bare root exists, which resembles dead bone very closely in histological structure. It has lecuna and canaliculi like bone, except in bone they are more regular in size, and contain bone corpuscles while in cementum, cement corpuscles are found. Dead bone is a foreign body and is therefore an irritant to vital tissue. Often there is present besides the denuded root, necrotic bone which has been destroyed by the presence of the abscess. All know that to remove this by medication would be impossible. Such a condition as is shown in this picture cannot be satisfactorily treated by medication or retained with safety. The only course to pursue is to extract or amputate, and a thoro curettement when necessary.

What I mean by a thoro curettement is not merely to insert a curette into the socket which is too large to enter the bottom of the socket, where the curettement is required. Such a pretense of a curettement is of no value but is undoubtedly harmful as the tissues not infected thus become injured. A sharp pointed instrument such as an explorer should be used to examine the socket and if the bone is found to be necrotic it should be removed by the use of sterile burs. A repeated examination of the sockets should be made during the operations in order that all portions of such tissue be removed. I think this can be accomplished more satisfactorily by the use of a local anesthetic.

It can, of course, be done under nitrous oxide but my experience has been that the local anesthesia is usually preferable. Some have remarked that it must require a great deal of courage to extract teeth which are useful for mastication and apparently comfortable. This would be true if one really believed that the usefulness and comfort of these teeth were more beneficial than the removal of the infection would be, or that the health would be impaired to a greater extent by the loss of the teeth than the presence of an abscess. I am sure in such cases no one would consider extracting. I realize it will be rather difficult for those who are doubtful about the results obtained in removing periapical infections to extract these teeth, especially where the extraction of many teeth is required. Unless all the infections are thoroly removed the results will be very disappointing. I believe one great mistake that is being made by many dentists is in leaving what appears to be only small infections upon the supposition that the area is not sufficient to cause disturbance, or endeavor to treat by medication any of these infected areas.

I regard the removal of these infections as necessary as the larger areas. I have taken cultures from the root apex of some of the teeth showing a small area and found pure streptococcus. The presence of streptococcus at the apex of any root draining into the blood stream is a very dangerous condition and no one who fully realizes the effects resulting from such organisms will allow them to enter the blood stream if it can be avoided.

That you may fully understand that the benefits derived from work of this nature is not based upon an erroneous conception of the results obtained, allow me to state that the greatest per cent. of my work done in this line is for patients who are referred to me by medical men. The results are not merely notions that patients have of being benefited, but are, in many cases, results shown by laboratory tests as well as physical examination on record in the offices of these various medical men.

It is known that the bacteria existing in abscesses is of a pus forming origin but it will be observed that the secondary infections resulting from these organisms are not always of a suppurative lesion. Just how it is possible for bacteria to produce pus in one case and not in another is not known. It is very evident, however, that a change in the character of the bacteria occurs. Just where in the body this change is produced has not yet been proven but it is known that the absence of oxygen is an influence in the production of this change. I do not believe, therefore, that the change occurs in the blood stream as oxygen is always present. Of course it is by the means of the blood stream that the bacteria is carried to the parts attacked. The change must be brought about in some part where the oxygen supply is scant. This must be in the tissue attacked for it would not be possible for the change to occur while the bacteria is being carried thru the tissue by the blood stream if oxygen prevents this change, unless the bacteria escapes from the blood stream for a time and locates in favorable tissue for the production of this change and then again enters the blood stream to be carried to the tissues attacked.

The presence of secondary lesions are often only an indication that a foci is present somewhere in the body. In order to prevent further secondary infection it is always very important that the primary foci be discovered and removed. Better methods for the disclosing of the primary infections will be of great value in preventing many diseases.

I know there is a question in the minds of many as to what should be done in cases where periapical infections are found and no systemic disturbance seems to be manifested. I feel it is my duty to advise patients to always have

the infections removed. I do not believe those holding the view that these infections should not be interfered with until a systemic disturbance is manifested are doing their part in preventive medicine. Indications of the presence of primary infections are usually present in these cases but not recognized. The secondary infections are only symptoms expressed thru these pathological conditions. To learn to recognize these infections by the symptoms as well as to locate the primary infections are problems before us today.

The method employed for making examinations of the mouth for infections is first to test the suspicious teeth or all teeth with large fillings or crowns to determine if the pulps are vital. An examination of the soft tissues as well as an investigation for impacted teeth are made. One often finds infected broken roots remaining where teeth have been extracted. I then have the teeth rayed. After the radiographs have been taken I decide upon the method of treatment. One cannot, however, rely upon the radiographs alone. I rely just as much upon the clinical findings as I do upon the radiographs in many cases. Where the clinical findings indicate strongly a pathological condition I often act upon this evidence. I think, however, that one should always endeaver to obtain the best pictures possible before a definite conclusion is arrived at. It is often necessary to take pictures from different angles in order to disclose some of the rarified areas. In many cases where I have felt justified to operate upon the clinical findings, I have found abscesses where the radiographs showed no indication of the condition.

I am always suspicious of treated teeth which give a history of having had a chronic abscess. I doubt very much if chronic abscesses are ever permanently cured. Altho the radiograph may be negative it should always be remembered that a negative picture proves nothing and should always be so regarded, but a positive picture can always be regarded as reliable evidence.

There is one condition that should never be overlooked in the examination of the mouth for infections and that is pyorrhea. While I do not believe a slight discharge of pus in pyorrhea cases is likely to produce the systemic disturbance that the so-called blind abscesses do, I am convinced, however, from my experience with these cases that very serious conditions do sometimes follow the presence of pyorrhea. We are so prone to think of these cases where the pus is discharged into the mouth and carried to the stomach are taken care of to a large degree, at least. While this view is generally accepted it does not prove to be correct from clinical observations. The only satisfactory method I employ for the treatment in advanced cases of pyorrhea is the use of the forceps. Do not hesitate to insist upon this course when the flow of pus cannot be satisfactorily controlled, regardless of the location of the teeth.

There are so many important conditions which I feel require our attention that I am at a loss to know which to mention at this time. Altho I wish to mention some of the results following the existence of pus conditions in children's mouths. I fear these cases are somewhat neglected because we think that the resistence of these little folks is superior to that of adults. Acute rheumatism and acute endocarditis are characteristic of youth and this I do not believe is generally known. Rosenow points out that the cusps of the heart of youth have a blood supply which later becomes obliterated and these tissues undergo a change and become fibrous. By this blood supply in the cusps of the heart of youth, the bacteria are carried to these parts by the blood stream and find entrance to the terminal arteries in the cusps, and owing to the scantness

of the blood supply the opportunity for anti- bodies and leucocytes to reach these parts and destroy the bacteria is made impossible, and the tissue of this organ is therefore made an easy prey for the bacteria possessing the property to infect. The same is true of the bacteria finding entrance to the capillaries of the tendons about the joints, making it possible to produce rheumatism.

I believe the retention of diseased six year molars as well as diseased deciduous teeth has produced much harm. I regard this a matter worthy of our most careful attention. If time permitted I should like to discuss this phase of the subject more in detail.

There are some very important causes for periapical abscesses. Perhaps the most frequent cause is the destruction of the peridental membrane, by the use of certain agents employed in the treatment of root canals. Another important cause is the infection resulting from putrescent pulps. We often hear it said that the primary cause for abscesses is the death of the dental pulps. This statement is somewhat misleading. Periapical abscesses are never formed without either the destruction or the infection of the peridental membrane. It is true that the infection of the membrane is sometimes caused by putrescent pulps. If this infection becomes chronic an abscess is formed. These infections, I believe are more often caused by the destruction or irritation of the membrane by agents used in the treatment of root canals. The death of the pulp is not necessarily the cause of this condition, but the infection or destruction of the membrane is the cause of abscesses, which is, as I have stated, produced in various ways. This can be satisfactorily controlled to an extent at least, by employing asepsis and agents that will not destroy the periapical tissue.

In our treatment of root canals we disregard the importance of the periapical tissue. Until we come to realize the importance of this structure, infection of pulpless teeth will continue to be a menace to the health of our patients to the same degree that it is today.

We are constantly presented with the traditional theory that imperfectly filled roots are the cause of periapical abscesses. After a careful analysis, your essayist is unable to accept this explanation.

Before proceeding further let us ascertain upon what grounds the theory is based. To my knowledge there never has been any evidence offered either experimentally or otherwise to prove that an opening in a root canal will cause an abscess. We are told that there will be a seepage of serum from the periapical tissue when the root is not filled to the apex. This may be true if the periapical tissue is inflamed, but otherwise there should not be seepage of serum. Is it not also possible that a discharge of serum may occur from the periapical tissue lying directly in contact with artificial root filling, when the root is filled to the apex? Some may say that there is no space for the lodgment of the serum when the root canal is filled and that the serum would be absorbed. I am of the opinion that perfectly filled roots are very, very rare. Pastes or semi-fluids are always employed for the purpose of assuring a complete sealing of the canals. There would be some space following the absorption of this liquid. The fluid surely will not always remain in this state. While the space in the original would be greater in depth than where the root is more nearly filled, the space would, perhaps, be sufficient for the lodgment of a great amount of fluid, in many cases at least where acids were used to enlarge the foramen as the foramen is enlarged a great many times the diameter of the original size. I can illustrate this best in the next slide, Figure 3, which is a longitudinal section showing the apical portion of a cuspid

root, (a) the root canal, (b) peridental membrane, (d) multiple canals. These canals are very small. It would be necessary to enlarge the canals before the apex could be reached even with the finest broach. In the attempt to reach the apex, canal No. 1 would be most likely to be opened as it is directly opposite the main canal at (a). It must be granted that this could be accomplished and a filling inserted to the apex.

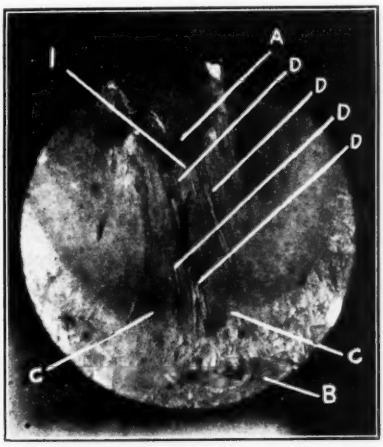


Figure 3.

There would still be three canals unfilled. Or if the purpose of this operation would be to include all of these canals in one by decalcifying the tooth structure lying between the canals, this would necessitate decalcifying the tooth substance at (c) which would detach the peridental membrane at that point and perhaps a destruction of the tissue would result from the action of the acid employed.

I might state here for the benefit of those who believe that multi-canals such as were shown in my clinic are rare, that 95% of the upper first and second molars have two or more foramina, 80% of the lower first and second molars, 70% of the upper bicuspids and 35% of the upper cuspids.

In view of the great possibility of grave injury to the membrane when the foramen is opened such a practice seems hardly justifiable. I know there are those who maintain that the foramen can be enlarged without this injury, but no one can determine the exact amount of acid necessary to decalcify the tooth structure without injury to this very delicate tissue. I am strongly of the opinion that if experimentation were undertaken to prove this contention, it would not stand the test.

Is it not possible also that where roots are perfectly filled that the serum might escape from the tissue as a result of the irritation of this foreign body? If this occurs there would be additional irritation by the pressure produced by the presence of the fluid resulting in such cases. If bacteria was present at the root end of the canal, or if bacteria was carried to this locality by the blood stream an infection would undoubtedly follow, as the serum is an ideal media. In such cases perfectly filled roots would not prevent abscesses.

There are also some reasons for believing that Nature would endeavor to close small foramina where a destruction of the peridental membrane has not occurred or no infectious material exists in the root canal. The presumption that serum would be discharged in all cases where an open canal exists to produce a condition favorable to the destruction of the surrounding tissue, is hardly in accordance with the physiological activity of Nature in other parts of the body where the tissues are normal. The tendency would more likely be to prevent the formation of the abscess.

I wish to have it fully understood that I am not presenting an argument against the filling of root canals to the end if an opening to the apex exists, an effort should always be made to fill it to the very end.

My purpose in discussing this phase of the subject is to urge you to use acids

with great caution to avoid the destruction of periapical tissue.

As is shown in Fig. 4, in the examination of 1000 radiographs, 13% of the roots had fillings extending to the apex, and of these, 74% showed rarified areas. Practically the same percentage of rarified areas existed at the apex of these teeth as was found at the apex of the roots only half filled. I realize these findings are not in accordance with previous reports, as they were placed in two classes —those with perfect fillings, and those not perfectly filled. It can be seen that if this had been done in the above case, the findings would have been decidedly different.

Figure 4.

FROM THE EXAMINATION OF 1000 RADIOGRAPHS.

No Rarefied Area Percentage		Rarefied Area Percentage	
Apex	25+	Apex	74+
Fair	32+	Fair	67+
Two-thirds	48+	Two-thirds	51+
Half	24+	Half	75+
No filling	5+	No filling	94+

13 per cent. of the above number were filled to the apex.

22 per cent. of the above number were fairly well filled.

34 per cent. of the above number were filled two-thirds to the apex.

23 per cent. of the above number were half filled.

8 per cent. of the above number had no fillings.

My opinion is that we will never be successful in preventing periapical infection so long as the members of the profession cling to the theory that imperfectly filled roots are the chief cause or that these infections can be cured and a recurrence prevented by inserting artificial material to the apex of roots.

The radiographs employed for this investigation were not obtained from any individual practice for such a report might be regarded as being only the results of the individual dentist's work. Neither were these radiographs obtained from operations by dentists in any one locality for these findings might be regarded as being due to inferior work by the dentists of the locality.

I realize that it is impossible to always make a diagnosis from radiographs alone. Clinical findings are, in my practice, regarded as valuable as are radiographs. However, this is true only where the radiographs fail to disclose any positive evidence of pathology.

In these investigations I selected only the radiographs that showed evidence of having dead pulps with or without root fillings, and exercised great care in selecting teeth showing areas that were pathological in my opinion. While I do admit there may be a possibility of erring in the interpretation of a small number of these radiographs, this would not, I am convinced, be sufficient to materially alter the percentage of this report. As no history other than the clinical findings was available it might be maintained by some that abscesses were present before the roots were filled. This may be true but since it applies to all the classes in the above chart, the ratio would remain the same.

I would like to call attention to some of the conditions resulting from the use of formaldehyd. I employed this agent exclusively for some years in the treatment of septic root canals. The results obtained were apparently very satisfactory, which I find is the opinion maintained by a large number of dentists today. The deleterious results that can be so clearly seen in the slides are not always clinically apparent while treatment is being carried on. Neither are these conditions always disclosed by the radiograph immediately following treatment. If radiographs are taken of teeth where these preparations have been used a year or longer after treatment, it will be found that a high percentage of rarified areas will be shown. There will be found a variation in the size of these areas depending upon the amount of tissue affected by the formalin used.

I have slides showing a great variety

of conditions following the use of formaldehyd preparations.

It is not my intention, however, to bore you with an explanation of all these conditions, neither do I wish to tire you with the detail of the technic employed in these experiments. I wish only to say that these investigations were carried on by the use of dogs at the Surgical Department of the Research Laboratory of the University of Minnesota. Young dogs were used for this work to avoid the possibility of employing teeth that might be pathological. A controller was used in each case treated. I will also show some of the conditions existing in the periapical region of the teeth used as controllers, as well as those where formalin preparations were employed, that you may clearly note the change which has resulted, due to action of the remedy.

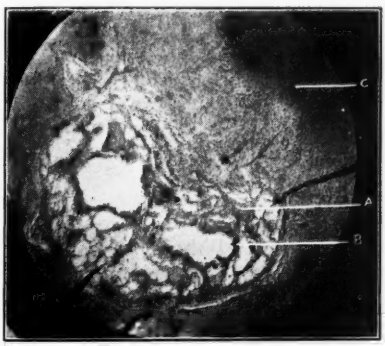


Figure 5.

Figure 6.

Figure 5. This slide shows the condition following the removal of the pulp in an upper right central where cresol formalin was sealed in the root canal with cement. A, dense accumulation of leucocytes. B, a destruction of the peridental membrane. C, root end. The destruction of the membrane as shown in this slide is indeed very serious. The destructive action of this gas does not cease here, however, but extends far into the cancellous bone in all directions exerting its effect upon the tissues existing therein. Figure 6 is a photomicrograph of the medullary cavity from Figure 5, showing highly inflamed tissue at (a). B is the condition shown in Figure 5. The condition in the medullary cavity may appear to some a matter of little consequence and will have no material effect upon the tooth tissue. If there is anyone present who maintains such a belief I trust he will endeavor to become familiar with the important function of these tissues. You are all well aware of the fact that bone cannot remain vital without the medulla.

My purpose in conducting this experiment was to ascertain the effect formaldehyd has when sealed in root canals where the pulp has recently been removed. I question very much if such a condition will ever again become normal. If a radiograph should be taken some time after this treatment and the infection found, the cause would likely be attributed to imperfect fillings, and if the root filling extended to the apex the infection would undoubtedly be regarded as being of unknown origin.

Figure 7. This is a slide of the upper left central of the same dog where a mild antiseptic was placed in the root canal after the pulp was removed. The peridental membrane of this tooth is

normal. (a) root, (b) peridental membrane, (c) bone.

Figure 7.

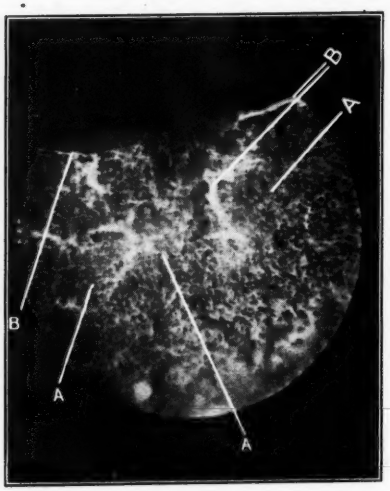


Figure 8.

Figure 8 is from a tooth where the pulp was removed from the canal, placed back into the pulp chamber with a small quantity of pus from an abscess, to produce a putrescent pulp. This remained for seven days before a treatment of formocresol was sealed in the canal. The tooth was treated three times with this agent at intervals of three days. Violent inflammation exists at (a). (b). Liquification of membrane.

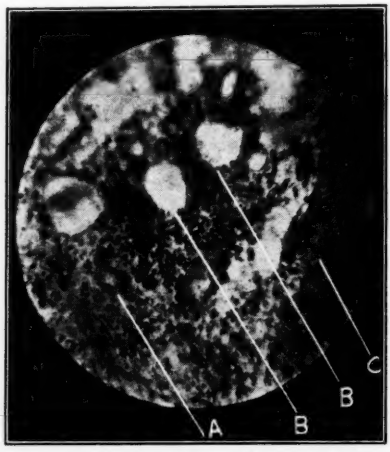


Figure 9.

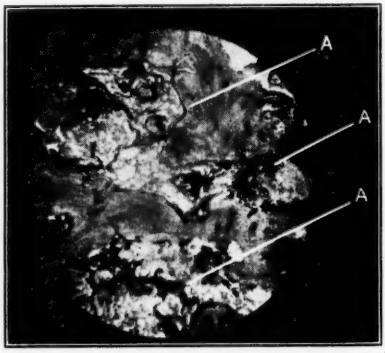


Figure 10.

Figure 9 shows the action of formaldehyd upon the medulla resulting from

its use in the treatment of root canals. (a) indicates violent inflammation, (b) destruction of blood vessels, (c) bone.

It is maintained that such an agent as cresol when mixed with formalin alters the destructive properties of formalin. The photographs demonstrate most conclusively that such views are erroneous. There are those also, who maintain that if formalin is placed in the upper portion of the pulp chamber, no deleterious effect will follow. Investigations prove that such views are also erroneous.

Figure 10 shows the medulla of a

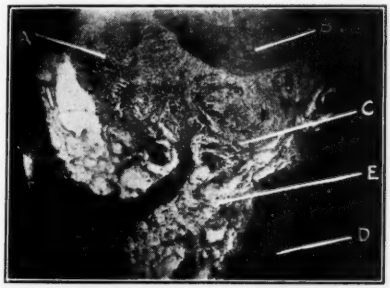


Figure 11.

tooth where a mild antiseptic was used at (a), which is normal.

Sodium and potassium is another remedy which is being used very extensively and which I have recommended at various times in my writings for the saponifications of the dead pulp tissue, believing it to be safe. It was first recommended, I believe, by Dr. Schreier of Vienna. Figure II shows what follows the action of this agent upon the peridental membrane, (a) being dense accumulation of round cells, (b) the tooth apex, (c) liquification of tissue, (d) bone, (e) inflammation extending into the medulla.

Figure 12 is a photograph prepared from the same dog, where sodium potassium was not used, showing the peridental membrane to be normal where only a mild antiseptic was sealed in the root canal after the pulp was removed. (a) indicates tooth, (b) peridental membrane, (c) bone.

There are other results following the use of these preparations to which I have not called attention. I have only presented some of the results obtained by these investigations, that all may fully understand that the position I have taken regarding these remedies is justifiable.

Figure 12.

I wish to offer a word of caution regarding the use of sulfuric acid for the purpose of enlarging root canals. This agent has met with much favor in recent years from a large percentage of our profession. I have much apprehension, however, concerning the results likely to follow the improper use of any acid for this purpose. It is impossible to enter some root canals without the aid of acids. If acids are confined to the mouth of root canals, no injury can result. There appears to be a preference for sulfuric acid by most dentists in root canal work. This agent is never employed for decalcification of teeth in their

preparation for microscopic specimens, because insoluable substances are produced by the action of sulfuric acid upon the calcium salts of the teeth.

Figure 13 illustrates what results from the use of sulfuric and of hydrochloric acids in root canals. Two teeth of about equal size were selected. One tooth was placed in each bottle. Fifty per cent. sulfuric acid was placed in bottle No. 1, and 50% hydrochloric acid in No. 2.

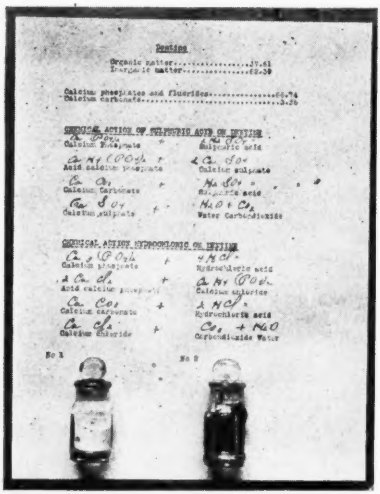


Figure 13.

It will be observed that in No. 1, which contained the sulfuric acid, substances formed in the bottle. These are insoluble products such as calcium sulphate or plaster of paris and acid calcium phosphate. In bottle No. 2, a clear solution exists demonstrating that soluble substances are formed by the action of hydrochloric acid upon calcium salts of the teeth. The substances formed by the action of the acids upon the teeth are given in this slide. Those that result from the action of sulfuric acid are adherent to the surface of the tooth acted upon, preventing immediate contact of the acid with the surface of the tooth; the action of the acid is thus retarded somewhat. In the use of hydrochloric acid there is no such interference, therefore the action is more rapid, and the use of hydrochloric acid is advantageous.

However important may be the etiology of periapical infections no one can fail to realize that these conditions have their inception in the removal of pulps. Realizing this fact, it is hardly conceivable how anyone can escape a feeling of apprehension regarding the employment of remedies which might in any way jeopardize the pulp.

In October, 1914, I undertook some investigations upon dogs at the Research Laboratory of the University of Minnesota to ascertain what effect Dr. Buckley's Paste has upon the pulp tissue.

While it is claimed that this preparation can be used with safety these statements are based only upon clinical observations. Let us hope the day will come when our profession will demand proof upon scientific investigation for all remedies offered.

Those who employ these preparations may rather resent my remarks, but I trust it will be fully understood that all the statements I have made, as well as those I am about to make, are not offered in a spirit of criticism, but rather are actuated by a most earnest desire to correct methods which I have found to be harmful.

It is not my intention to present very extensively the results of these investigations, but to offer a few photomicrographs of the pulp tissue upon which this paste has been used.

For further knowledge regarding the action of this paste, I would refer my hearers to an article by Dr. H. Prinz which was published in the August issue of the Dental Cosmos, p. 853. I might say, however, that shallow cavities were made in the teeth and a small quantity of the paste was sealed in with cement which was allowed to remain for 4 days before the dog was killed.

Figure 14 at (a) shows an area of violent inflammation existing in the pulp tissue, at (b) excess leucocytes.

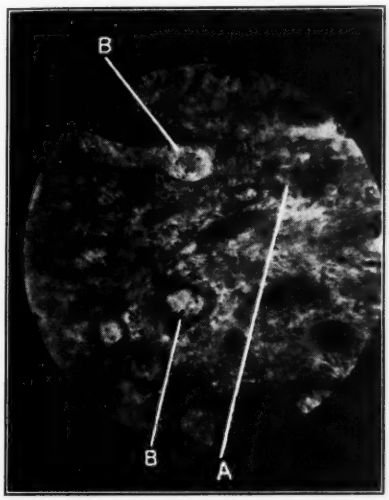


Figure 14.

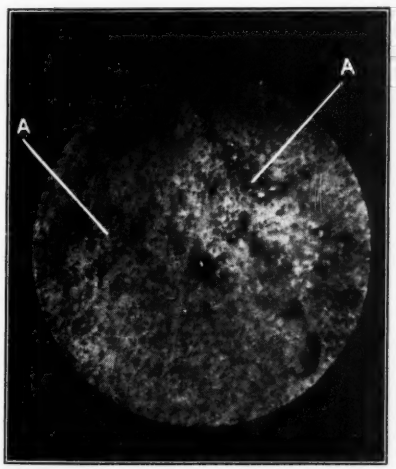


Figure 15.

Figure 15 shows much the same condition in another portion of the same pulp. (a) indicates excess leucocytes.

Figure 16 is a photomicrograph of the pulp tissue from the tooth of the same dog from which the sections just

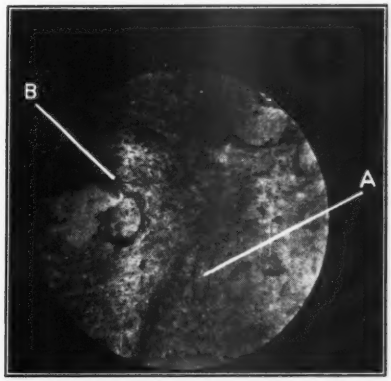


Figure 16.

shown were made, oil of cloves being sealed in the tooth instead of the paste. (a) indicates blood vessels, (b) the neu-

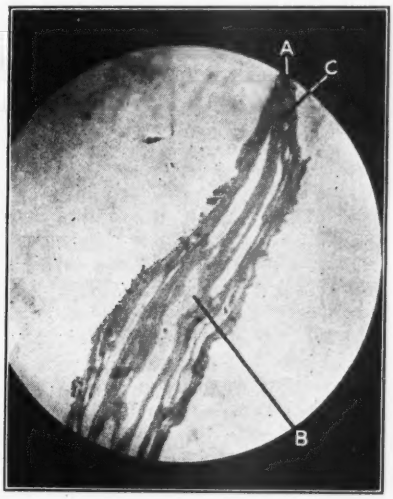


Figure 17.

clei of the connective tissue cells, which are not clearly shown, owing to the thickness of the section. It is evident

that excess leucocytes are not present in these tissues.

Figure 17 is a photomicrograph of another pulp where the paste was used. (a) indicates the occlusal portion, (b) indicates blood vessels showing excess

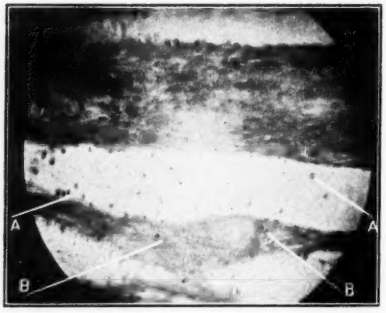


Figure 18.

leucocytes, (c) migration of leucocytes into the tissue at the region of the apex. As the vessels in the occlusal region are absent the condition of this portion of the pulp cannot be so clearly shown, but (d) indicates an area where the leucocytes have migrated into the tissues.

Figure 18 shows a higher magnification of one of the vessels indicated at (b) in figure 17, (a) being leucocytes in the blood vessels. The excess leucocytes show very clearly that inflammation exists in this pulp. (b) shows a migration of leucocytes into the tissue. It is very doubtful if a pulp in which inflammation is found to be so general will ever become normal.

In conclusion I wish to state that it was not my purpose in this paper to describe in detail the conditions which were found to follow the action of the remedies employed in these experiments, but to show in a general way the deleterious effect resulting from the use of preparations which have been mentioned. I am fully convinced from the evidence obtained from these investigations, with the years of experience with these preparations, that formaldehyd should never be employed as a therapeutic agent for the treatment of any dental condition.

BLACK. "Special Dental Pathology."

NOYES. "Dental Histology and Embryology."

FISHER. "The Relation of Mouth Infection to Systemic Disease," The Dental Summary, August, 1915.

ONE HUNDRED TWENTY DEGREES FAHRENHEIT.

By S. N. Young, D. D. S., Cincinnati, Ohio.

THE following extract of certain contributions is offered for the purpose of attracting attention to the possible destructive property of vital organized tissue from the application of unnatural temperature of high degree; and to diseases incident to the human race that we have been able to trace to this causative factor; diseases resulting chiefly from the coagulative effect exerted upon albumin. Altho other constituent elements must surely be involved, because of lack of scientific equipment and clinical opportunity, we have not been able to prove the full pathological possibility of this destructive factor.

The following degrees of temperature, with consequent effect upon organized substance, especially upon that of the human variety, or a correspondent, have been found recorded and by experiment.

98.6° F. The temperature of man and mammels in health, and the probable proper temperature at which food should be ingested.

110° F. The degree implied when *hot* therapeutic measures are advised, and the degree obtained by an instinct test to determine the upward limit of safety in one still under the guidance of nature.

113° F. Active perspiration is produced. This function is largely for the regulation of body temperature, and to some extent to eliminate albumin and certain other waste products. Its activity at this degree therefore suggests the approach of a symptomatic temperature.

120° F. Proteid coagulation begins.

122-125° F. Coagulation of egg-albumin becomes visible to the naked eye, and at 150° F. (the scalding point) a large quantity of this albumin is set to a semi-solid consistence. The egg-albumin used in this test was of a type homologous to human albumin, and the test therefore, as applied to the human species, a practical one.

130° F. The Lassar test. Acute inflammation was produced, and a lymph formation eight times greater than that of normal formation, tested at the same time and in the same subject, was brought about, and coagulation was found. The narrative further states that the lymph in Lassar's experiment "differed from liquor sanguinis in containing less proteid and having a slighter tendency to coagulation than that of the liquor sanguinis."

While the Lassar test was made with a view to study exudation of fluid, it is remarkable that a discovery of such marvelous pathological possibilities should escape notice, or if recognized, should be allowed to pass without proper emphasis being given.

140° F. Destruction of digestive enzymes, proteid bodies, begins, and at 176° F. all enzymes are destroyed. Digestive enzymes are products of metabolism, and are most active at the normal temperature of the particular species. With acute inflammation developing at 130° F., and even below that degree, we cannot expect normal ferment production or normal activity of digestive enzymes at a temperature of 130° F. Less activity can we expect from application of a food temperature progressively higher than that degree. Clinical observations prove this an assertion.

Thermal sensitivity of the oral mucous membrane was tested with variable results. 115° F., a practically safe upward temperature, to one accustomed to

a moderate habit, at first, gave a repulsive response. Increasing the temperature until a degree of 145° F. was reached, a sensation delight was experienced. At 155° F. a slight burning was sensed, but no pain was felt until a temperature of about 165° F. was reached. Some mouths accustomed to the extremely hot food habit, will tolerate a temperature that approximates the boiling point.

By gradual increase the epidermis will eventually tolerate a temperature well above the scalding point, as is seen in the example of exposure of surfaces like the face and hands, to hot applications or to frequent immersion in hot water; but the sensation of pain is more strongly pronounced in this tissue and because of this the painful response of the outer surface of the lips is a fairly reliable guide to approaching danger in ingesting hot food, provided no attempt has been made to educate this surface to tolerate a high temperature. An accurate thermometer test is, of course, the only truly reliable guide.

Attention was first attracted by the disease pyorrhea-alveolaris. Thermal tests were made and all such victims were found to habitually ingest their food at a temperature well above the scalding point. This disease in its early stages quickly disappeared by reducing the food temperature to 115° F. In severe cases where from absorption of alveolar tissue more tooth substance is exposed, an upward limit of 110° F. was necessarily placed, and pleasing results obtained. In extreme cases, however, in which great absorption of process and loosening of the teeth had occurred, further attention was required, as immobility of such teeth is necessary, and all forms of local irritation were necessarily removed or reduced to a minimum. In patients of sedentary habits physical exercise is required, because active metabolism is necessary to the reestablishment of a normal condition.

The diseases pyorrhea-alveolaris, rheumatism and gout had always been mysteriously associated clinically. Our attention was next given to rheumatism. These patients were found to have contact usually with extremely hot water or other forms of unusually high temperature, at frequent intervals; coagulation and consequent circulation of coagulated proteid with symptoms resulting. All such cases as we have been able to control have been readily relieved by avoiding contact with a temperature that will coagulate albumin, proving the causative factor.

Altho in acute cases of rheumatism profuse perspiration, brought about in such a manner that further tissue destruction will not occur, and attention to other phases of this disease by reliable medical attention is often advisable, we have not had to resort to such measures, our work being done purely with the object of experiment to prove the causative factor; depending upon nature alone for remedial measures in every case.

We have traced several cases of endocarditis, and chronic nephritis to the same cause as that of rheumatism, the symptoms manifesting in the heart, the kidney, or sometimes in both of these organs. These symptoms, even in very severe cases, passing away readily thru the same line of treatment. One of these latter cases was of personal experience of more than five years duration, with increasing symptoms, a consequence of frequently washing the hands in hot water that often reached a temperature near the boiling point.

In severe cases of rheumatism, endocarditis and chronic nephritis it is advisable to avoid extensive surface contact with a temperature much above that of the body itself. As a precaution in these cases we have usually placed an upward limit of 105° F.

We have had no case of gout for observation but it is no more than reasonable to suppose that gout is a different temperamental manifestation of the same

causative factor for the reason that an abnormal quantity of uric acid is constantly found in that class of patients, and uric acid is a by-product of fatty degeneration of tissue which is a possible course of destruction of tissue following injuries from scalds and burns.

Clinical facts show that want of the ptyalin enzyme in carbohydrate food digestion, the missing of it in beer drinkers and the destruction of or injury to this ferment by high food temperature in another class of patients, is largely responsible for the disease diabetes-mellitus.

The theory of hydrolysis is usually applied to the phenomena of carbohydrate digestion, but the fact has not been clearly proven. We adopt an opposite view for the reason that acids are dehydrators, and cite an example in the disease in question. In the disease diabetes-mellitus the chemical sugar formula is the same as that of the monosaccharide formula, C6/Hl2/O6, which is abundant in food most restricted in the diabetic diet, which formula contains one molecule of H2O in excess of that, of normal sugar C6/HlO/O5, found in the liver and else where; also of that of the polysaccharide formula C6/HlO/O5, of the food constituent which many dietitians favor as a proper food in this disease.

The acid of the stomach is the only logical dehydrator found along the digestive tract. That a preliminary preparation by the ptyalin is necessary to this dehydration would seem to be demonstrated in the fact that in the former class stomach digestion but no ptyalin digestion is obtained; in the latter class neither the ptyalin or early stomach digestion if affected. (Ingestion of proportiones of monosaccharide food (?) in the form of candies, sugar, and the like, in such excessive quantities that natural results cannot be accomplished, is of course a factor of importance in connection with the cause of this disease.)

Basing upon this theory, which while perhaps visionary seemed rather more logical than theories usually advanced with reference to the cause of this disease, we were able to produce wonderful improvement in a patient who, at the time we became interested, was passing into the hopeless stage of this disease. Our observations were made without cooperation. A representative was kept constantly in attendance, and the improvement was gradual. Note of the medical attention was taken and during the entire period palliative remedies only were prescribed. Our "treatment" was simply to see that the food was taken at a temperature that would not injure ferment action, and to see that thoro ptyalinization was performed.

Many cases of stomach indigestion were treated and yielded remarkably by reduction of food temperature. A precaution against danger from ptomaine poisoning from uncooked food that is not known to be fresh and pure, always being given.

The pathological consequence from proteid coagulation and chemical reduction of tissue elements from contact with excessively high degree of unnatural heat, and from circulation of these products thru the blood vessels, is of boundless possibility.

The habit of hot food ingestion, and of application of hot substances to the body for different purposes is so universally common among civilized people that the destruction is far reaching, and the habit pitifully tragic. The result is disastrous not only because of ignorance of the distructive effect, but because of the common erroneous belief that an opposite effect is obtained, that the hotter the food and application the greater the benefit derived.

Bibliography of the above data has been given in previous contributions, "Render Unto Cæsar," and "New Ideas in Pathogeny."

REVIEW OF DENTAL LITERATURE.

By R. W. Bunting, Ann Arbor, Mich.

IN A CASUAL survey of the contributions to dental literature during the past year, the reader will be impressed by the great preponderence of articles which have been directed toward or related to but two definite lines of thought, namely, the relation of mouth infection to systemic health and the treatment of root canals. So great has been the interest along these lines that few issues of dental journals are found which do not have some contribution to one or both subjects. It has, therefore, been decided by the writer to confine the scope of this report very largely to a consideration of some of the more notable papers upon these two subjects.

Among the contributions to the relation of mouth infections to the body as a whole, a symposium of papers was given by Drs. Moorehead, Billings, and Irons before the American Medical Association at their last annual meeting in Detroit. These papers were published in the Journal of the American Medical Association and also in the Dental Summary for November, 1916. Dr. Moorehead reported the findings obtained in the treatment of patients in the Presbyterian Hospital in Chicago. He stated that in a group of 498 cases of chronic arthritis 89% of these patients had alveolar abscess and 76% had pyorrhea. In a second group of patients having systemic conditions other than arthritis, 74% had chronic abscess and a third group presented 69% so affected, from all of which he draws the conclusion that these abscesses and pyorrhetic conditions are related to the general bodily disorder of the individual. Of the two conditions he believes that the enclosed abscess is more dangerous than the open pyorrhea pocket and emphasizes the importance of careful root-canal treatment. He makes the statement that in his opinion not more than 25% of all root-canals which have been filled are safe. He further says that not more than 10% of the dentists are capable of doing difficult root-canal work and that but 10% of the people can afford to pay for such expert service. From which he concludes that a very large per cent. of the people are infected by dental abscess and that more teeth should be extracted. He pleads for diagnosis and removal of dental infection and that the health of the patient be held in higher regard than the conservation of the teeth.

Dr. Billings discussed the varying pathogenicity of the strains of bacteria which may enter the body and the reaction which the body had toward them. He enlarged upon the statement that even benign forms of bacteria might become harmful when grown in an inclosed place such as the pyorrhea pocket or alveolar abscess, and that the resultant effect was determined by the ability of the organism to damage body cells and ability of the body cells to withstand such action.

In the continuation of this discussion, Dr. Irons gives his opinion based upon observations made upon patients in the Cook County Hospital. He concludes

his remarks with these significant statements.

"The attitude of the physician in studying his patient should not be that of the prosecuting attorney bent on convicting the teeth of being the cause of all disease, nor should the dentist assume the brief of the defendant, ignoring the evidence of roentgenograms and systemic disease. Both must work in harmony, each believing in the sincerity and good-will of the other, observing professional courtesy and laboring to place the patient in the best physical condition possible."

"There seems no question that in many cases alveolar abscesses are the sources from which invading organisms pass into the circulating blood and produce lesions in joints, eyes, nerves and other structures of the body. It is also true that alveolar abscesses, like tonsilar and other infections, may be latent in so far as any marked effect upon the general health in concerned. Nevertheless, they are potential sources of trouble and from the medical standpoint, and I believe from the dental, should be eliminated. The recognition of the important relation of alveolar abscess to systemic disease is a great step forward, and the period of extreme neglect of the past will never return. The readjustments in methods of diagnosis and in the establishment of rational conservatism will come gradually as we learn to appreciate the interdependence of all organs of the body and the community of interest to the dental and medical professions. And this advance in turn calls for better medical education, better dental education."

"The difficulties and misunderstandings from which we are now emerging afford one instance among many of the necessity for providing educational facilities which shall provide broad-minded professional men who can appreciate problems of departments of human medicine other than their own."

A notable contribution entitled "A Clinical and Experimental Study of Chronic Alveolar Abscess in Relation to Systemic Disorders" was given by Dr. Thos. Gilmer, of Chicago, before the New York State meeting, May 1916, and was published in the December issue of the Dental Cosmos for that year. He says, "It is not improbable that the damage done by oral foci in the production of systemic disorders is at times overestimated, since overenthusiasm is generally the rule following new discoveries in medicine, * * * however so much has already been proved and the theory is so reasonable that we cannot ignore its possibilities. * * To attribute every ailment to which man is heir to foci of infection is poor logic for either medical men or dentists, but to stop one's ears to well proved facts is equally illogically." He also attributes more importance to blind abscess and deep pyorrhea pockets than to infected areas which have free drainage. In cultures made from cases in St. Luke's hospital he found that the prevailing organism in acute abscesses was the hemolytic streptococcus, and that in chronic abscesses it was streptococcus viridans. When these organisms were injected in animals they showed a marked degree of selectivity for tissues which were affected in the patient from which the cultures were taken.

There has been an almost unanimous corroboration of the principles laid down by Rosenow, Billings, Hartzell, and others that localized dental infections do have the ability to produce serious disturbances in the blood vessels, joints, heart, kidneys, nerves, and various other organs and tissues. The significant feature of the contributions of this year is the universal surprise that is expressed at the vast number of foci of infection which are to be found in the mouths of patients selected from all walks of life. Moorehead states that they are more prevalent among those who have

had considerable dental service than among those who because of limited means have foregone such service and sacrificed their teeth. In any event it has caused every thinking practitioner to realize more than ever the importance of proper treatment and filling of root canals of dead teeth, and the diagnosis and subsequent treatment of all dental infections.

As a result of the increased importance which has been given to the treatment and filling of root canals, a great many contributions upon that subject have appeared during the past twelve months. Many of these have been descriptions of root canal technic in detail which have attempted to teach aseptic root canal surgery and the complete filling of such canals to or thru the end of the root.

Of these W. M. Wright, in the Dental Cosmos for November, 1916, advances the following technic. He states that devitalization should be done under conductive anesthesia and never by arsenic. When ready to open into the canals he wipes the rubber dam with 70% alcohol and a solution of Iodine in benzol. He boils his broaches and keeps them under alcohol until ready for use. In the opening and cleansing of small canals he recommends the use of the Sodium-potassium paste and sulphuric acid. He speaks of the sulphuric acid as being self-limiting in its action, but is to be neutralized by sodium bicarbonate. The canal is then wiped with a combination of bichloride of mercury and hydrogen peroxid and a dry cotton dressing sealed in under cement. At a subsequent sitting the canal is dehydrated with alcohol and acetone and is filled with gutta-percha in chloroform under pressure, an attempt being made to force the soft gutta-percha thru the end of the root to form a minute button over the apex.

W. B. Dunning in a paper entitled "New Standards in Root Canal Filling" which appeared in the June issue of the Dental Cosmos for 1916 says that it is his custom to take a skiagram before opening a tooth for canal work. In this manner he obtains a general view of the anatomy of the roots. As he operates he keeps his cavity flooded with absolute alcohol and when the pulp is removed he floods the chamber with carbolic acid and pumps same down into the canals to or thru the apical foramina. He then seals in a dressing of carbolic until a subsequent sitting. If the pulp be putrescent he places a single drop of formocresol upon it and flows thin cement to fill cavity, but objects to the use of that drug when no putrescence exists, or in an empty canal. He also mentions cresol as an efficient canal dressing. In the opening of small canals he advocates the use of Schreier's paste and 3% hydrogen peroxid but objects to the use of sulphuric acid. Barbed broaches are preferred by the writer which he uses as files to enlarge the canal. Ionic medication is suggested in preference to drugs on account of the limited action of the latter. Gutta-percha points and rosin are used for filling the canals, the points being dipped in bichloride of mercury and then forced to and thru the end of the root with canal pluggers which are previously coated with a film of paraffin. He anticipates that the teeth will be sore for 24 hours after filling in this manner.

Elmer S. Best has two articles in the Dental Review, namely, May 1916, and January 1917, both of which he opens with an emphatic declaration against the devitalization of teeth. He bases his belief upon the examination of over 3000 dead teeth in which less than 10% were filled, and 70% of the remainder showed necrotic changes in the periapical region. He then gives a classified technic to be used in various groups of cases, in which he advises the use of formocresol, sodium, sulphuric acid, ionization, gutta-percha and rosin. He

then gives a long list of reasons for failures in root canal work and another list of means by which such failures may be prevented.

Edgar D. Coolidge also has two papers upon the same subject in the Dental Review for October 1916 and March 1917. In these he gives a detailed description of a close application of the Callahan principles of root canal surgery slightly modified. He advocates the use of files for the enlargement of canals, and outlines a method by which the canal may be filled to the end but not thru. When he has the canal ready for filling he fits a canal plugger to it which will pass to within 2 mm. of the apex and no further, the length being determined by comparison with radiograms of the tooth. With this he carefully packs the first piece of gutta percha point which is about 2 mm. in length, and subsequently fills the remainder of the canal using larger pluggers and sections of gutta-percha points.

R. Ottolengui in his Round-Table of the Items of Interest for December 1916 says that complete aseptic and sterile root canal surgery is impossible. He suggests that every effort be made to perfect the technic as far as is possible and then reinforce such technic with suitable germicides at crucial moments in the operation. He speaks of the difficulty in having a large enough stock of sterile cotton swabs to last thru a long operation and suggests that they might well be rolled between the fingers of the operator and used immediately if they be dipped in a solution of mercuric chloride of peroxid of hydrogen in the proportion of 1 to 500. He has by experimental cultures determined that they are sterile even after having been used to swab an infected canal.

In the July Cosmos for 1916 Carl J. Grove gives the results of a study which he has made of the anatomy of root canals. He has thoroly cleansed the ca-canals by instrumentation and alkalis, and then filled same with a mixture containing red sulphid of mercury. The tooth is decalcified and impregnated with glycerine which causes it to become more or less transparent so that the course of the filled canals may be seen thru the mass of the tooth. The most remarkable results of this experiment, which has been corroborated by others, is that many root canals are seen to break up at the apex into a number of minute openings, many of which are at right angles to the canal proper. The author says that 75% of all canals have two or more openings at the apex of the root, while many have several times that number. All of which is very significant in the surgical treatment of root canals.

In all of the foregoing articles there is considerable unanimity of opinion as far as method of instrumentation are concerned, the differences being only that of minor details. But as regards the medication and types of drugs to be used much controverting discussion has been raised. There are those who advocate the use of strong reagents such as sodium and potassium, sulphuric acid, bichloride of mercury, formocresol, cresol, etc., while others claim that damage is done to the periapical tissues by such strong medication from which these tissues never recover and that a permanent injury is produced which at a later time may become infected from the blood stream and be the seat of an abscess. Specially bitter has been the attack upon the use of formalin. In this connection the Prinz-Buckley controversy of some two years ago will be recalled.

In the Dental Cosmos for December 1916, Carl J. Grove published a new contribution to our knowledge of this subject, being the report of results obtained in animal experimentation in the laboratories of the University of Minnesota. He begins with the promise that injuries to the peridental membrane either by instrumentation of chemicals

are the cause of periapical infection in teeth the root canals of which have been filled. In the experiments which the writer made teeth of animals were opened and formalin was sealed in. After several days the animal was killed and sections were made thru the tooth and periapical tissue in which it appeared that the peridental membrane was destroyed and that degeneration had taken place in the medulla of the bone in the immediate vicinity with the destruction of the blood vessels. This effect was noted in cases in which the formalin was placed only in the pulp chamber, some distance remote from the apex of the tooth. Similar experiments were made with the sodium-potassium pastes and the tissues about the apex of the tooth showed marked degeneration and death while sections of other teeth treated with bland medicaments showed no damage whatever. Trials were also made of the Buckley Desensitizing paste with the result that the pulps of teeth so treated show marked inflammatory changes. These results, if corroborated by other observers, are significant, but it must be remembered that in research work of this sort, the investigator may very easily be misled by the influence of preconceived ideas which he may have had of the process. Such data then should be verified, if possible, by an impartial worker who could check these results before they be accepted as proven and final.

An interesting side light upon the subject of root canal medication is seen in an editorial in the Dental Cosmos for January 1917 in which Dr. Kirk reports the possession of five teeth, the root canals of which had been filled over 30 years ago by Dr. J. Foster Flagg. These teeth were the last remaining dental organs in the mouth from which they came and had been recently extracted. Upon examination it was found that the root canals had been filled with cotton-wool saturated with beech-wood creosote. The editor draws no definite conclusions from these teeth but calls attention to the fact that they remained in the mouth after their neighbors had been lost and speaks of them as "the survival of the fittest."

Dr. Ottolengui in an editorial in the Items of Interest for February 1917 deplores the appearance of the Cosmos editorial, calling the principles suggested as "the easiest way," and the case in question as "the survival of the filthiest." He calls attention to the fact that from the extracted teeth alone no one could determine the state of health of the tissues about such teeth. He cites a case which came under his own supervision in which he extracted five teeth for one patient, all of which had been filled with creosote by Dr. Flagg and all of which were badly infected and abscessed. He objects to the assertion that antiseptics will remain potent for some time when sealed in a root canal. He even doubts the possibility of temporary sterilization of infected root canals by germicides, basing his belief on experiments in which he obtained bacterial growth from cotton soaked with formocresol which had been sealed in a root canal for three days. The editor denounces in strong terms the dependence upon drugs as continued germicides for the safety of root canal fillings and characterizes such teaching as malicious and dangerous.

In the July Items of Interest for 1916, Dr. Ottolengui published in his Round Table replies received from a question which he had put to a number of men as to the possibility of clearing up a chronic granulation tissue at the end of a root of a tooth, the so-called granuloma. A considerable difference of opinion is evident from the various replies, some believing that strong caustics might accomplish the result. Others advised root resection, while two believed that a cure could be obtained in almost every case by ionization. From

all of which we see that we are far from agreed upon the proper methods to be employed in the therapeutic treatment of root canals either in the presence or absence of an apical abscess. It is very important that careful and unbiased research be devoted to these problems in order that our methods be standardized and our treatment more intelligent. In the meantime we may accept the opinion which is shared by all that the treatment and filling of root canals is an exceedingly difficult and exacting task, which requires the application of our best efforts to perfect our technic in aseptic root canal surgery.

In the light of the difficulties attending the after treatment of teeth which have been devitalized there has been an almost unanimous opinion that the living pulp should be conserved wherever it is possible to do so. In direct contradiction to this principle I. N. Broomell presents a paper entitled "A Plea for the Removal of the Healthy rather than Diseased Pulp" which appeared in the Items of Interest for March 1917. The author opens his paper by recalling his former publications upon the adventitious effects upon the pulp of large masses of gold in contact with tooth tissue. He states that in his opinion a pulpless tooth is better than one having a diseased or abnormal pulp. Thirty years is given as the age of maturity and above forty he finds a large per cent. of pulps are degenerated and in which calcic formations have occurred. Soreness of the teeth is believed by the author to be as common in cases of degenerated pulps as because of root canal fillings, while the chances of health are better if the pulp be removed while still normal. He then makes the emphatic statement that teeth well filled are not likely to reinfection from the outside. In regard to the effect of these irritations he says, "Freshly cut cavities for inlays to be used as abutments for bridges will result in much more pulp irritation than those created by slow process of caries. Likewise the hasty removal of enamel and resultant instantaneous exposure of dentin will be followed by greater pulp irritation than the slow process of enamel destruction in cases of mechanical or chemical abrasion. The former in each instance prohibits the possibility of Nature's help in protecting the delicate pulp structure, which the latter in each instance encourages this." He then goes on to show that such irritations produce scerotic changes in the pulp which either results in a calcific degeneration of that organ or in a diminution of size of the pulp canals so that it is impossible to successfully open and fill them when devitalization becomes imperative. His slogan of "Remove the Pulp Before it Becomes Diseased" may be somewhat radical, but is a timely note of warning to those who are today going to great extremes in attempted pulp conservation. There is more than a little truth in his implied idea that the wholesale application of partial and whole crowns and large inlay restorations to vital teeth will result in a harvest of degenerating and dying pulps, the canals of which will be so diminished in size that extirpation and filling will be next to impossible.

In the light of such an array of contradictory opinions it is not to be wondered that many are at a loss to know what their duty is in regard to root canal work. While these questions are still unsettled is it not wise to be misled by the radical statement of the enthusiast, but rather choose that which seems to be most rational and practical and act accordingly. We certainly must have better root canal surgery and a perfection of the technic of every practitioner to that end. When this has been done there is no reason why teeth which are fully formed should not be devitalized whenever the removal of a pulp is necessary to good dentistry, specially after the age of 30.

In conclusion we would state that there have been a number of important articles on the treatment of Pyorrhea which have appeared during the year. Of these there were but two or three which dealt with the use of emetin in its various forms or of the vaccine treatment. The remaining contributions are almost unanimous in their advocacy of surgical treatment alone. Some of these describe in detail the technic to be used which varies in minor details according to the views of the writer but all agree in substance that surgical interference alone is able to produce results in the large majority of cases. There is not time to review these articles in a discussion such as this, but for the benefit of those who are interested in the literature upon this subject and wish to know the methods which are employed by those who are doing the most in the treatment of this disease, a list of such articles is appended:

T. Sidney Smith, Dental Cosmos, November 1916; also Items of Interest, June 1916.

V. MacDonald, Dental Cosmos, January 1917.

Thos. Hartzell, Journal of Allied Societies, March 1917.

Gillette Hayden, National Dental Journal, January 1917.

C. E. Kells, Items of Interest, December 1916.

Paul Stillman, National Dental Journal, February 1917.

A. H. Merritt, Dental Cosmos, January 1916; also Journal of Allied Societies 1917, page 639.

AVERAGE DENTURE CONSTRUCTION A DISGRACE TO THE DENTAL PROFESSION.

By William A. Giffen, D.D.S., Detroit, Mich.

(Read before the Michigan State Dental Society, Detroit, Mich., April 13, 1917.)

MY CHIEF reason for using the above title is that I believe the time has come for plain speaking and that a member of the dental profession who would be offended by hearing the truth should change his profession.

After *Preventive Dentistry, Denture Construction* is next in importance;—a fact which our profession does not seem to realize.

Owing to the fact that many more teeth are being condemned than ever before and the fallacy of long fixed bridges has been recognized, there is a growing demand for full and partial dentures, which our profession as a whole are incompetent to supply, except in a very rudimentary and crude way.

A large percentage of dentists will tell you they do not like to construct dentures. The writer believes the principal reason for this is they do not know how to get accurate results. It is a subject that the general dental practitioners knows very little about. He will tell you he can't afford to do this work on account of the small fees or that the dental laboratory is not to be relied upon. In regards to fees:—there is an old saying *"that as a rule you get about what you pay for."* I think that this will apply to the dental profession and the fees they get for artificial dentures, except that fees for dentures are usually too high, as many of the dentures are not worth as much as a good pair of shoes. We all know the way business is done in the dental laboratory. My sympathies are all with the laboratory man. They are not to blame for the way they have to do business. I often wonder how they do so well. The dental profession is to blame for the conditions that exist. There is a trait in human nature of wanting something for nothing and it is just as prominent in the dental profession as it is in any other class of people.

The rule that you get what you pay for applies here just as well as it does any other place. If a dentist knows how the work should be done and will take the time and trouble to instruct a good laboratory man to do it just that way and is also willing to pay the price, his dentures will be worth a better fee.

The American public is willing and able to pay for superior service in Prosthetic Dentistry, but they are not willing to pay good fees for dentures of average construction. Why is the average so low? There are three principal reasons for this:—the text-books, the dental teachers, and last but not least, the tendancy of such a large percentage of dentists to drift in the direction of least resistance.

The authors of our text-books on Dental Prosthetics seem to have been inoculated with the same "bug," and are obsessed with the idea that they must describe the technic for all prosthetic operations in as many different ways as all the previous writers together have devised, and then leave the dear student to work out his own salvation. *They*

describe all material and methods fully, no matter whether they are obsolete or not. In fact it would seem that most of the knowledge exploited was gained by *working of metal models.*

It is to be hoped that in the very near future some man who has had sufficient clinical experience to convince himself and the profession that he can write a text-book demonstrating only the one best system of constructing artificial dentures will do so and leave the obsolete methods for the man who simply wants to be known as an author.

The teachers on Prosthetic Dentistry in the colleges further complicate matters owing to the fact that a large majority of them cannot see any further into the future than their next pay day. They familiarize themselves with the contents of the accepted text-books and proceed to furnish this knowledge to their students year after year. The various materials and methods taught in such a mixed up manner are just about as instructive and interesting to the student as dental anatomy is to the freshman who has not had occasion to restore tooth contour or open into a root canal.

I wish to quote a paragraph from a communication in the March issue of the Dental Cosmos, by D. D. Cornell, D. D. S., Des Moines, Iowa, formerly Professor of Prosthetic Dentistry, Ohio College Dental Surgery. "The truth is, the great majority of dental graduates have during their college life, 'sidestepped' as much prosthetic dentistry as they could and have not even an idea of what a true dental impression should be. This being true, how do they expect to master one of the most difficult operations that we as dentists have to deal with, by such complicated and exacting methods as are laid down by those who advocate the exclusive use of modeling compound." This statement proves that Dr. Cornell is not familiar with modeling compound impression technic. I can readily understand why he signs his name as "Formerly Professor of Prosthetic Dentistry." (Laughter). In fact it is the writer's opinion that any teacher of prosthetic dentistry who is not properly equipped to demonstrate the Dr. Green's principles of making impressions, understands the anatomical antagonizer and also Dr. William's system of selecting artificial teeth should resign his position as a teacher. For if he is not teaching these scientific subjects he certainly is antiquated.

The third and principal reason why average denture construction is so low lies with the dentists themselves. We know that even if our prosthetic text-book writers and teachers did their work perfectly our average would still be below par for the reason that this subject required a great deal of continual work and the exercise of considerable judgment for the dentist to become expert in denture construction.

When we can change the attitude of the dental profession so they will be ambitious to become as proficient in every branch of dentistry they practice instead of being contented to just drift along rendering only such professional service as their patients will put up with, denture construction and other branches of dental science will make rapid progress. In other words, the insufficient or unsuccessful dentist is either lazy or mentally deficit.

In considering the construction of dentures for an edentulous mouth, the average practitioner will make a digital examination of the patient's mouth, let the patient tell him approximately what kind of a denture to make and possibly the cost, and the dentist proceeds to make impressions and start the work at once.

The proper method of procedure is to make 'study models' of the case. This furnishes us with the opportunity of becoming familiar with the idiosyncracies of the patient. (They all have one or more.) We can better estimate the dif-

ficulties to be overcome. It also demonstrates to the patient that you are giving the case careful consideration, and helps to establish the confidence of the patient that you are capable of giving sound advice when you explain to them what you propose to do and why you are going to do it this certain way. This is particularly helpful in those abnormal cases where it is necessary to resort to surgical interference in order to make a suitable foundation for the denture. This may mean the removal of abnormally placed teeth, reduction of ridges of connective and mucous tissue which has been caused by the unequal resorption of the alveolar ridge, or the removal of portions of the alveolar ridge itself.

The 'study models' can also be utilized for the purpose of making individual trays which will require the minimum amount of material to make a correct impression. The average method of making an impression is to use an ordinary tray or cup with high flanges and a handle an inch and a half long, that will cover all of the surfaces to be covered with the denture and as much more as the soft tissues will allow when stretched out of position. The tray is heaped up with plaster or modeling compound, pressed approximately to position and held there until the material seems to be hard enough to remove, unless the patient gags or coughs it out of the mouth involuntarily. One material is just as bad as the other when used in this manner. If you think that this is not the average method used, I request that you visit any of the dental laboratories and you will be convinced. To properly make impressions of an edentulous mouth the following steps are absolutely necessary with whatever material used. 1st. The denture must be properly seated with the strain on the hard and soft tissues equalized as nearly as is possible when the stress of mastication is placed on the denture. 2nd. It must be the proper length in order that it will not interfere with the pharangeal muscles during the act of swallowing or coughing, nor must it be so short that it does not pass to the distal edge of the hard palate, thereby having adhesive broken when stress is placed on the anterior teeth. 3rd. The rim of the denture should be adapted as perfectly as possible to labial and buccal aspect of the alveolar ridge and extend as far over the ridge as is possible without interfering with or placing undue strain on the muscular attachments to maxillae in order to take full advantage of all the retention we can in a given case.

There is no reason why every dentist should not be able to develop a technic that will enable him to obtain this result. It does not make any difference whether in the case of two operators, the technic is the same in every minor detail, so long as it is sufficiently definite to be certain that they will both arrive at the same accurate results. The writer has for eight years practiced the principles of impression making as originated by the late Dr. J. W. Greene. I am absolutely convinced that it is the most accurate, scientific method yet devised.

I quote the following from the pen of my friend, Dr. Geo. H. Wilson: "There are many modifications of the Dr. Greene's method, taught as the methods of various teachers. They are all based upon the original method and honor should be given where due. Personally, I desire to say that I believe Dr. J. W. Greene has done more towards teaching the underlying principles of impression making than any other man or group of men. However, this does not imply that he should be followed in detail, but the principles underlying his teaching must be used with whatsoever material is being used.

Further, the Dr. Greene method is well adapted for Post-Graduate teaching of experienced, adaptable and thinking men. It is the only method by which a

tested impression can be produced." This statement coming from the author of probably the most scientific and practical text-book on this subject and a teacher of great reputation simply proves that results are what count and they cannot be obtained by using slip-shod methods with any material.

The average model is made by mixing plaster with water any old way; if the mix is too thin more plaster is added, if too thick, more water is added. The mix is jarred into the impression, allowed to set and then separated. *The proper way to make a model is to select a "Greene Ready-Made, Non-Changeable, Approximate metal model"* to fit the impression. A sufficient amount of plaster to cover the inside of the impression and the ridge of the metal model is mixed and placed in position. The metal model is gently pressed to position in impression and the excess of plaster which has been squeezed out around the edge wiped off. When the plaster has set, the impression should be removed and models trimmed. You now have models which are about 95% metal with a thin film of plaster over them. No model can be made that is less changeable; they will not warp or break and will stand a great deal of abuse. There is no possibility of squeezing them out of shape by careless packing, flasking or vulcanizing. Spence plaster compound, Weinstein's artificial stone or any other material may be used in preference to plaster. Any kind of metal base-plate can be swaged over them perfectly in a rubber block swagger. The writer also would suggest at this point that the only safe way to make a cast metal base-plate is to make two models for each case, cast the base-plate on one model and then swage it over the other model to correct any warpage or change in shape which may have taken place during the crystalization of the mass of metal.

The average bite-plates are made by using a roll of wax and having the patient bite into it until they can get their lips together, or by using a sheet of base-plate wax or other plastic material and adapting same over the models upon which rims of wax are built in a more or less sloppy manner. Is it any wonder that nine times out of ten the bite is not correct? The temperature of the mouth and the strain on the plates will cause them to change shape and again the abnormal amount of material in the patient's mouth interferes with normal opening and closing of the mouth. *The proper way to make bite-plates is to swage a sheet of* "Ash & Son's No. 7 Soft Metal" over the models in a rubber block swager and trim to line of muscular attachments on models and then upon these soft metal base-plates build rims of base-plate wax. The metal bite-plates have many advantages: they fit as accurately as the finished denture will fit, the temperature of the mouth will not cause them to change shape, they will stay in position, they require the minimum amount of way with which to take the bite. The patient will not object or become impatient while you are building on or trimming for feature restoration.

After the condyle path had been established and the median and high and low lip line marked they are ready for placing the teeth by simply cutting out the wax rims in sections as the teeth are set up. The metal bite-plates take the place of the wax base-plates. This is also of great advantage as they protect the models from getting daubed up with the hot wax—they are exactly the same thickness as the roof of the finished denture should be, and the surface shows any ridges, rugae, or other irregularities the roof of the mouth may have, consequently the denture will have a more natural feeling to the tongue. The denture will require the minimum amount of polishing and finishing and will have the maximum amount of strength in the roof of the denture with the minimum amount of rubber. In the average case this is not true.

In the average case the old antiquated and obsolete so-called "straight line" articulator is used. The proper method is to use one of the so-called anatomical antagonizers. The Gysi Adaptable being the most scientific. Personally, I believe the Gysi Simplex or the Snow is all right from a practical standpoint, provided you use the mouth itself for the final adjustment of the teeth, for the reason that even the Gysi Adaptable Articulator does not make allowance for the difference in the relation of the dentures between the position of rest and the position when stress of mastication is applied upon them.

The face-bow is necessary to assist in getting the correct relation of the bite-plates or occluding rims to the condyles of the mandible and transferring same to the antagonizer. When the occluding rims are properly contoured the next step is to select the proper mould and size of teeth to be used. The writer accepts everything Dr. Williams has offered in relation to his system of selecting artificial teeth. It is a certain, definite and simple system and truly revolutionary as it eliminates guess work almost entirely, the teeth being the most perfect representations of natural teeth ever produced. (What the S. S. White new Vulcolox tooth is, I am not prepared to say, as I have not had occasion to see them or to try them.)

Dr. Williams makes plain the mistakes of nature which may be at least compromised in the selection of teeth of the proper but different mould that the natural teeth of the patient were, in order to overcome the lack of harmony which previously existed. We should always bear this fact in mind as frequently we may change the form of the dental arch and obtain a more harmonious result. In regard to artificial molar teeth the writer is of the opinion that Dr. Williams, in his zeal to imitate nature, has made the error that other designers of artificial teeth have done, viz: —the bucco-lingual diameter of these teeth is too great for the majority of cases. In a large percentage of cases the lower molars are lost long before the patient begins to wear dentures. The tongue having nothing to confine it laterally becomes wider in this region, so that when molars as wide bucco-lingually as the natural molars were are placed in the lower denture there is not room enough for the tongue. This is a very serious fault in lower dentures. We have always been taught that we should select broad molars so we may have more masticating surface. This is another fallacy of the text-books and teachers, for the reason that a person has not the power behind a denture that he had in his own natural teeth and if the teeth were say about a millimeter narrower than the natural molars it would increase their efficiency in addition to making space for the free movement of the tongue.

In summarizing I want to impress upon all of you gentlemen *and ladies* that are interested in this subject that you first must standardize the technic and methods by which to do any given piece of prosthetic dentistry, and secondly you must do it in a neat manner so that the finished article will be not only efficient but esthetic in appearance. I have neglected to say anything regarding vulcanization and vulcanizers for fear of taking up too much time, but just a word about this subject at this time will not be amiss. You are all using the wrong vulcanizer, the dental laboratories are using the wrong vulcanizer. This sounds strange but it is a fact that more plates are ruined in packing and vulcanizing than at any other step in the construction of dentures. There was a time when a celluloid press was in nearly every office or laboratory. Did it ever occur to you that what held good for packing and vulcanizing celluloid was just so much better for vulcanite or rubber? Viz.:

Closing the flask when the material was in its most plastic state, thus eliminating the compression of the plaster matrix walls and model, caused by the expansion and contraction of the rubber. Rubber is in its most plastic condition at about 250° F. The type of vulcanizer that I use is a modification of the Celluloid Press and is called the Edson Vulcanizer. The flask is closed in the vulcanizer when the thermometer registers 250° F. and then vulcanized as usual at the proper temperature.

I also wish to give credit to the man who has done more for the elevation of prosthetic dentistry,—having raised it from the stigma of a trade to that of a separate specialty of dentistry and to the dignity of a profession and science was Dr. J. W. Greene. Credit is also due to such men as Gysi, Williams, Geo. B. Snow, Wilson, The Detroit Dental Manufacturing Co., The Dentists Supply Co., and to Dr. Cummer, of Toronto, Canada, (for his work on partial dentures.) (Which I advise every one to hear at this meeting.)

Applause.

Discussion.

DR. N. S. HOFF, Ann Arbor.

I am in hearty accord and sympathy with what Dr. Giffen said, particularly about the importance of this work. The surprising thing to me is that dentists are so careless in the matter of serving patients with prosthetic appliances, outside of bridge work. We all think that if we can make a bridge, crown or inlay, that we have done something that is of real value to the patient. Every dentist thinks that his bridge work or crown work is the important thing that he does nowadays. Now I think that the most important thing we do is the restoration that we make for people who have lost the most efficient function that they have in their whole system, that is, the function of mastication. Some one wrote an article some time ago in one of our popular magazines, that dentists were criminals because they were furnishing old people with teeth so that they were able to eat more than they ought to. That article was as absurd as is our conduct, it seems to me, in relation to this matter. The restorations we make for our poor unfortunates, who have lost all their teeth and the opportunity of enjoying life and good health are most important, and yet we do this service very carelessly. Why is it that a man will take hours of time to get a wax impression of a simple cavity in a tooth that he may make a restoration of only a part of that one tooth, using every facility that he can to secure a good wax impression of the cavity so that he can restore the tooth to something like its normal form, when he will do the most perfunctory thing that is possible in securing an impression for a whole denture. It seems to me so absurd that I can't understand how this part of our professional work is so carelessly treated. Why can't a dentist at least learn to take accurate impressions? We should use more care and learn how to do this thing as well as we do inlay, crown or bridgework.

Most dentists pass up this most important service that they ought to do and seem to feel that prosthetic restorations can be done indifferently. I cannot understand it from my viewpoint nor can Dr. Giffen understand why the profession takes this attitude to so vital a matter. Dr. Giffen thinks it is because we don't teach the subject properly in the dental colleges, and write proper text-books. In a way this criticism is just, but to me the fault does not all lie there. We have fallen into the habit of delegating this work to the office boy, or the dental supply house, and the more we do this, it seems, the more satisfied we are that that is all right. We have got to get away from such practices. I have nothing against the dental supply houses who run these dental laboratories. They are doing the best they know

how with the conditions that they have put up to them. The wonder to me is that they get any results at all from their work. The usual procedure is to take the impression in any sort of careless way and send it to the laboratory with $2.50 and expect the next day to get the plate back ready to put in the mouth. We put it in and tell the patient to go to work and get used to it. It is not made for the patient any more than is a ready made set. If it doesn't deform the patient excessively the dentist is absolved from further obligation. The dentist usually tells the patient he has to get used to it, but what he means is that the patient has to accommodate himself to the denture. There is no personality, no individuality to such dentures at all, and that is what Dr. Giffin is inveighing against here. We don't study patients, we don't know what we are doing, in fact we don't seem to care. The process is simple and anyone can learn it. There never was a time when there were so many good methods of doing prosthetic dentistry as there is today. This subject is being worked out carefully and scientifically by the best minds in the profession today, and if anyone is willing to undertake this work, he will find plenty of helpful material. It is possible to make work that is so individual in character that it serves the patient well and without inconvenience. Why we don't get enthusiastic about this matter instead of spending so much of our time studying the root canal problem on how to fill root canals more perfectly, I can't understand. There is no branch of our work that I want you to alight in any way, nor do I want to detract from any progressive effort, but I do want to make as strong plea as I am able for better prosthetic dentistry. To my notion, there is nothing in the art of dentistry that is so poorly done today, and there is nothing that ought to be better done, and can be better done than it is, if we are really interested in it. Your lack of interest you say, is because you don't get results, and desirable ones, and what one man can do another can. With the facilities and natural ability we have today, it is not impossible for any dentist who is willing to go at this work honestly and conscientiously, to become a master at it. There is nothing difficult at all about it, and as I said before, we have every opportunity of learning some of the best methods ever devised that will bring success if we learn them. It seems to me it is largely a question of our "getting religion" on this subject, and going at it in a conscientious sort of way. I don't believe we should let these bugbears that seem to stand in the way interfere with doing our plain duty. It may be a troublesome branch of practice, but the more difficult the cases are the more fun you will have and the more you will get out of it when you finally master a few difficult cases. There is nothing that I believe I get so much pleasure out of as getting a real difficult case and then succeed in making a denture that the patient can utilize to good advantage. It is wonderful how grateful these people are and how much they appreciate your efforts and when you get them into that frame of mind you need not worry about your fee. That is one of the last things we want to think about. Don't make bargains with patients in advance that you will make an appliance for a certain price, but when you get thru and give them the service, then tell the patient what it is worth to them and to you, and you will get your fee, no matter what it is. You will get remunerative fees when you have served patients with this work just as much as you will get it for any other kind of service. There is no service the patients are more thankful for than this very thing, and it is one of the things, it seems to me, that we overlook, much to our discredit.

TREATMENT OF LACK OF DEVELOPMENT OF THE MANDIBLE.

By George F. Burke, D. D. S., Detroit, Mich.

(Read before Michigan State Dental Society April, 1917.)

In many cases of mal-occlusion of the teeth, where there is an apparent shortening of the lower arch accompanied by protruding upper incisors, nasal breathing as it should be practiced is out of the question for the reason that in many cases the closing of the lips is a conscious effort, and the patients keep on with the mouth breathing.

Children should be taught early the importance of nasal breathing, and the need of using full lung power; if this is not done the blood is short of oxygen, tissues are underfed and the child appears pale and anemic. In nasal breathing the air is filtered, warmed and moistened before being passed on to the lungs. Nature does not so treat the air, when passed in thru the mouth, therefore the harmful practice of the mouth breathing should in all cases be discouraged.

Aside from marked improvement in the general health in many of these young patients treated for this trouble, there is in all cases a genuine appreciation because of the better appearance. The spirits and disposition often improve, for either a protruding mandible, or one showing a lack of development sometimes gives rise to a form of mental depression owing to the consciousness of a mal-formed countenance. It would require a woeful lack of imagination and sympathy, to regard these conditions with apathy not to see the injustice of letting helpless children grow to a hampered manhood and womanhood, crippled physically and mentally, their pride hurt with a depressing consciousness of disfigurement.

Treatment in these cases consisted first in the mouthing of the clamp molar bands and plain expansion arches on the lower teeth and after the necessary lengthening and widening of the lower arches had been accomplished a similar appliance was mounted on the upper arch in either case with sheath hooks soldered opposite cuspid teeth, followed

Figure A-1.

Figure A-2.

by the use of the Bakes intermaxillary elastics. This treatment was continued for a period of ten months, at which time bands were made for first lower molars, and lingual arches made use of to maintain the occlusion.

Figure A-1 shows a patient at the age of eleven. Models were taken and ap-

Figure A-3.

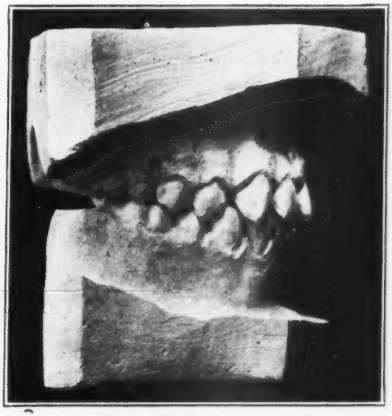


Figure A-4.

Figure B-1.

peared as shown in Figure A-3. This case has been recently completed and photograph of patient and models appear as in Figure A-2 and Figure A-4 respectively.

Figure B-1 was treated in exactly the same manner as Figure A-1. Figure B-2

Figure B-2.

shows a very recent photograph, the picture of models show how the teeth appeared before and after treatment.

Figure B-3.

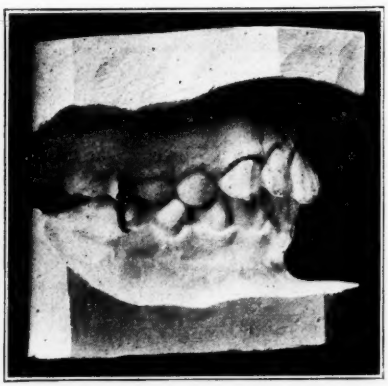


Figure B-4.

TECHNIC OF REMOVING COMPLETELY IMPACTED LOWER THIRD MOLARS, REQUIRING NO POST-OPERATIVE TREATMENT.

By James H. Howell, D. D. S., Detroit, Mich.

(Read before Michigan State Dental Society April, 1917.)

1. At a previous sitting, the mouth was put into a clean aseptic condition by a prophylactic treatment.

2. Inject Novocain-Suprarenin, by the inferior mandibular technic and if the saliva is very profuse 1/160 of a grain

Figure 1.

of Atropin. This is given to dry up the saliva, by the time the Novocain-Suprarenin has taken effect the Atropin will also have done its duty.

3. Thoroly wash the mouth with some antiseptic mouthwash and then with grain alcohol.

4. Place around the operative areas cotton rolls.

5. Paint the area with iodine.

6. Make a "J" shaped incision to the bone. (Figure 1.)

7. Lift the flap after carefully dissecting the periosteum away from the bone, under the flap, exposing the bone over the tooth. (Figure 2.)

8. Make two grooves, parallel, thru

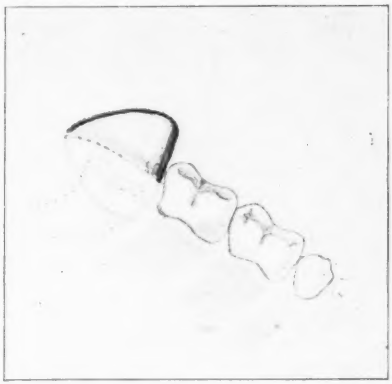


Figure 2.

the bone down to the tooth. One at the mesial side of the tooth and second at the distal side of the tooth. These grooves are made with a cross cut Fissure bur No. 560, and on the buccal side of the process. It can be determined by

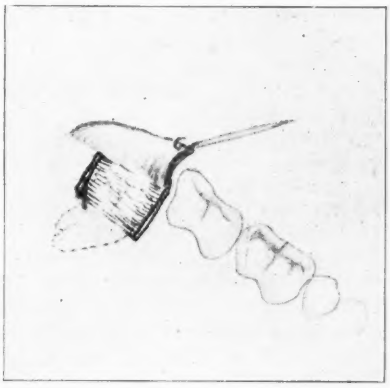


Figure 3.

the picture just where the tooth is located and where the grooves should be made. (Figure 3.)

9. The area of bone between the grooves can now be easily chiseled out, exposing the tooth. (Figure 4.)

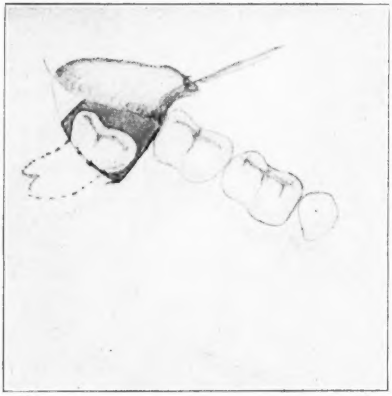


Figure 4.

10. The tooth can now be lifted out with an elevator.

11. The wound is carefully swabed out with sterile sponges, removing the bone grindings and blood.

12. Replace the flap of tissue with the periosteum on the under side and put one horse hair ligature at the curved part of the "J." (Figure 5.)

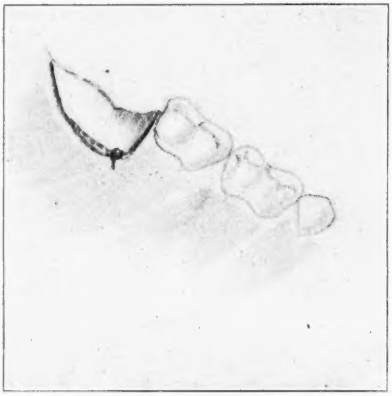


Figure 5.

13. Carefully instruct the patient how to keep the parts clean with frequent washings of some antiseptic mouth wash.

14. Have the patient return in from 24 to 48 hours for you to remove the ligature.

THE COUNTRY DENTIST AND THE TREATMENT OF PYORRHEA.

By M. G. Skinner, D. D. S., Ithaca, Mich.

(Read before Michigan State Dental Society April, 1917.)

I am not a specialist in the treatment of pyorrhea, but am engaged in the general practice of dentistry, the same as the most of the men who attend the State Association. Conditions in our town of about 1800 or 2000 inhabitants are about the average as you will find them the country over.

We are often disappointed by what we get at conventions because it is largely theory and utterly impractical in rural places.

For a number of years, in fact ever since entering the practice of the profession, I have been interested in the treatment of pyorrhea, and studying methods, and the proper diagnosis of the disease. We should be more interested

in it, because, in that way, I believe, we could be of more service to humanity than in doing many of the operations that we perform. The trouble is that we become discouraged from lack of knowledge, and the little help we are able to get from literature on the subject—every writer at variance with every other.

The following apparatus I deem necessary to the proper treatment of the disease. Compressed air, spray bottles, and warming apparatus, good scalers of some standard make, all of which any man, regardless of location, can easily procure. If you have no electric current, get a hand pump, a tank, and bottle warmer equipped with an alcohol lamp; these things are essential in every case, regardless of the method of procedure later.

I am asked nearly every day if pyorrhea can be cured. Yes and no. It depends on the variety of the disease, for pyorrhea is not all alike, and the dentist who bases his theory on the mistaken ideas that the disease is all of the same kind, is on the wrong trail.

For instance. A man came into my office three weeks ago today, with gums swollen so badly that if I were to cut this cotton roll off and put half of it under my lower lip, it would not be distended worse than his. He was suffering great pain, and unable to get relief. He wanted to know what we could do for him, and was told that he could get relief quite readily, and that by proper cooperation on his part, could be permanently helped.

On further examination the following conditions were found. Gums badly swollen, color a deep beefy-red, deep pockets surrounding the teeth, extreme sensitiveness, some calculus present, but not as much as you might expect, a bloody pus discharging into the mouth. I was convinced of a more deep seated cause that was at first apparent, and asked him if he had had a urinalysis made in the last year or two. He said he had not, but that several years ago he had been examined for urinary trouble, and found everything all right. I advised him to go to a physician at once, and have an analysis made. He came several days in succession, without carrying out my instruction but finally did as I suggested, and found he had a case of diabetis.

Now I maintain that in directing a patient to this discovery, I am doing him infinitely more service than by filling a few cavities in his teeth, or putting on a shell crown. He has been given a hint that may prolong his life for several years.

Can you cure the disease? says the patient. I cannot cure diabetis, and your trouble is a complication of pyorrhea with diabetis. But by proper cooperation of patient, physician, and dentist you can be greatly benefited. We may safely promise every patient the same.

My part of the work, after the patient had been placed on a diabetic diet, avoiding sugar, starch, and all excesses, should proceed as follows:

First, wash out the pockets with a good antiseptic such as the one I have here, composed of cresols, phenol, gelatin and water. It is quite difficult to compound, hence I have it prepared as you see here.

Second, do some careful scaling, UP, not down, as taught by many schools, and thus avoid infecting the tissue deeper. Keep washing out the debris with the antiseptic solution. Avoid deep scaling at first sitting. Don't attempt to treat pyorrhea at all unless you have compressed air and spray bottles, as you are doing the patient damage by further infection.

At the second sitting I swab out the pockets with a dilute solution of hydrochloric acid, allowing it to remain only a moment to loosen the deposits and then washing it out with the spray bottle. Have the patient keep the mouth open till the acid is washed out for apparent reasons.

At the close of this second sitting when the pockets are comparatively clean, I use Dr. Talbot's Remedy, which is made up of zinc iodide 15 parts, iodine 25 parts, glycerine 50 parts, water 10 parts. Apply with small pledget of cotton on small probe. Allow this dressing to remain. Do not use but little at a time.

Furnish the patient with a supply of the antiseptic mouth wash such as was used in the spray, with instructions to use five or six times daily, rinsing the mouth thoroly.

The next case is of a man who came in a few days later, a farmer. He had a bad condition in his mouth, most of the teeth being affected. A white, creamy-like pus was discharged. You could see from the way the mouth looked that this had been coming on gradually; it did not come on spasmodically like the other. The first case was very spasmodic and it came on quickly. In this latter case, the trouble came on more slowly; he did not notice it much until the teeth began to get loose. There was not very much swelling or redness. I said to him, Have you had a urinalysis in the last year or so? He said, No, I have not. I said, You should go tomorrow and have the doctor make an analysis of the urin. He said, I will do that. I did not see him again for three or four days or a week and when he came in again he was asked the result of the analysis. Nephritis-Bright's disease. Again you have directed the patient aright. The physician, in all probability, would not have discovered it at all; wouldn't ever think to ask him about conditions because he was a farmer, working hard every day.

You ask if pyorrhea causes Bright's disease? I am not here to say whether Bright's disease causes pyorrhea or pyorrhea causes Bright's disease; I don't know. It is a fact, however, that they are complications oftentimes and that is the way I have classified it. I think it is likely a complication. With those two kinds of pyorrhea I would advise them to go to a physician for examination.

You now have the etiology of them and how to diagnose them, the color of the gums, the color of the pus, the extent to which that has gone in a certain time, general conditions of the patient, how long he has been troubled. You may send the patient to a physician today and not find signs of Bright's disease in the urine, while tomorrow you may. The presence of albumen in the urine is not constant so that the fact that the doctor does not find it does not prove the absence of the disease. In such cases I think the dentist's method of finding it is better than the physician's.

The third class of pyorrhea as I classify it is infective—the infective variety. This may occur at any age of the patient. Last week I examined the mouths of seventy children in the schools in one of the small towns of our county. Out of the seventy children I only found two healthy mouths. Five of them had pyorrhea—children under ten years of age and two of them very advanced cases of it, and if I am not badly mistaken, one that is very bad has nephritis, or diabetis. I would not be able to say exactly which, from a casual glance. I think those two in particular had either one or the other of these troubles.

The infective variety is caused by so many things that it is pretty hard to get them together. One of the first things which causes it probably is calculi collecting at the necks of the teeth, a general uncleanliness, lack of care, and in some cases over-zealous brushing with a dirty toothbrush. However, we don't have to caution people about that very often. Some dentists may have been working in the mouth and found calculi present and in using scalers, pushing down and crowding the debris under the gums, thus infected the patient thru careless operations. Secondary infections, ill-fitting crowns and bridges, ill-

fitting plates. Partial plates are another cause; drinking cups in schools; using the same drinking cup in your own family may infect your mouth with the amoeba or whatever it is. I don't care what the specific germ is.

I have been asked several times today if I would use autogenous vaccines. I would not in a country practice. If I were in a city where I could have the use of a laboratory, perhaps I might do so, but not in a country practice, for obvious reasons. If you do some fool thing for that patient and they get in trouble, you will feel the recoil quicker than you will in the city, so I would not advise a man in country practice to use autogenous vaccines.

Now gentlemen, this little talk has been badly broken up by questions and other interruptions, and is not complete, but I have compiled in tabulated form the results of my investigations, both original and from consulting various authorities, in which you will find pyorrhea classified under five distinct heads: 1. Diabetic. 2. Nephritic. 3. Infective. 4. Senile, and 5. Traumatic, each with diagnosis and treatments suggested. You who are interested are welcome to a copy. We trust you may continue to work along the lines here suggested with beneficial results.

VARIETIES OF PYORRHEA.

Compiled by M. G. Skinner, D. D. S.

1. DIABETIC.

Etiology—A complication of diabetes.

Causes—Trauma, mechanical and bacteriological irritants.

Pathology—Excessive hemorrhage; color of gums dark red. Extreme tenderness to pressure.

Diagnostic hints—Urinary findings, sugar, and pathologic indications. Light creamy pus.

Prognosis—Dependent on age of patient and duration of disease. With cooperation of patient, fairly good results may be obtained.

Treatment—Diabetic diet. Raise immunity of patient. Frequent and careful scaling. Pockets washed by pressure sprays with good mouth wash. Avoid deep scaling without flooding pockets.

2. NEPHRITIS.

Etiology—A complication of interstitial nephritis. Alcoholism a main feature. Bacteria secondary but always present. Mechanical irritation-plates, crowns, bridges, etc.

Pathology—Mild exacerbations. Slow in progress, gradual recession of gums. Gums dark bluish red. Thin white exudate, foul odor.

Diagnosis hints—Differs from diabetic in color of gums. Tartar hard and tenacious. Inflammation spasmodic.

Prognosis—Dependent on progress of disease. Fairly good if nephritis is not too advanced. Relief always.

Treatment—Rigid prophylaxis in conjunction with treatment of family physician.

3. INFECTIVE.

Etiology—Occurs at any age of patient. Writer has had cases in children ten years of age. No respector of age, sex or social position.

Causes—Trauma of gums produced by tooth picks, pins, dirty brushes, knife blades, etc., and by mechanical irritation—crowns, bridges, plates, etc. By the careless dentist in scaling and cleaning. Resulting infection.

Pathology—Local inflammation. Swollen gums of various colors from dark bluish red to light red. Pus pockets more or less frequent. Alveolus destroyed in advanced stages. Bacteria constant.

Diagnosis—As per above indicated.

4. SENILE.

Etiology—Occurs usually after 50 years of age. Shrunken gums. Trauma primary causes. Lowered resistance. Mechanical irritants. Pockets may or not be present.

Pathology — Gums shrunken — often abrasion—color varies from healthy pink to dark red. Gums often tender to pressure. Hemorrhage frequent. When pockets are present, pus thin and watery.

Diagnosis—Age, loose teeth, recession of gums, onset incidious.

Prognosis—Bad.

Treatment—Antiseptic mouth wash, frequent brushing. Raise general health.

5. TRAUMATIC.

Etiology—Produced by mechanical irritation, over-vigorous brushing, over-zealous instrumentation, tooth picks, hard food substances, etc.

Pathology—Sudden onset, often very painful, marked swelling, fetid breath, extreme irritability of patient.

Diagnosis—History as above.

Prognosis—Good.

Treatment — Hygienic, removal of causes.

ORAL SURGERY CLINIC.

By C. H. Oakman, D. D. S., M. D., F. A. C. S., Detroit, Mich.

(Read before Michigan State Dental Society April, 1917.)

The first case exhibited was one referred by Doctor Inglish. This proved a case of Haemorrhagic Diathesis.

The patient's teeth usually were lost "by falling out." An upper right first molar came out in the above manner, haemorrhage continued for three days, it was then evident that something tangible must be done. The socket was curetted, and packed with gauze soaked in hot water, later adrenilin and per sulphate of iron were used; these gave only temporary relief.

The second and third molars were loose and infected, both were extracted and the septi between the roots were removed and the sockets curetted; this made a large clean wound.

Strong pressure was maintained for an hour with patient lying in bed with the addition of per sulphate of iron on the gauze.

Patient was in the hospital five days, making eight days of haemorrhage. The patient was very weak and condition was alarming as the patient was sanguinated and had a feeble pulse and was indifferent where formerly he had been grossly apprehensive of the outcome.

The second patient presented was Mr. B., age fifty-five, carcinoma of the lower right jaw extending from the medium line to the angle of jaw, the floor of the mouth was involved and the submaxillary gland, the cervical glands showed little involvement, patient complained of pain at night.

His teeth were broken down and decayed, he had never had his teeth cared for. A piece of tissue the size of the thumb nail was removed and examined by the pathologist who pronounced it carcinomatous. Patient refused operation, radium, or high frequency treatment. Prognosis was that he would die in from five to six months.

AN ESPECIALLY INTERESTING CASE.

The third case presented was Mr. M., age fifty-five, who gave a history of having worked in a match factory several years previously, this naturally made us think of phosphorous necrosis, but the lapse of seven years since his employ-

ment in the match factory made the prospects for phosphorous necrosis rather remote.

His urine was examined, which proved that he had no functional disturbances; two Wasseman examinations proved negative. His condition was one of severe necrosis combined with anemia.

Diagnosis was that both Antra were involved that the anterior portion of the jaw below the nose was necrotic together with the whole hard palate. The parts were so putrid that I hesitated to use a profound anesthetic or even a local, so concluded to get along without any anesthetic, which we did. An incision was made along the ridge of the upper jaw as far as the first bicuspid on either side. The palate being separated from the anterior jaw it was retracted and the bony support of the palate was removed to the posterior portion near the junction of the hard and soft palate. Both Antra were operated and a most purulent and odoriferous condition was present.

The bone on both buccal surfaces in region of Antra was removed nearly as far up as the Molar bone on either side. The flap or soft palate was brought forward and sutured as near its former position as possible. In about eight days a partial union had taken place as the circulation was greatly impaired, a few days later the parts separated and the palate began to retract at a rapid rate until it came within a half inch of the normal distal end of the hard palate. The contraction of the palate after the removal of its bony support was quite remarkable. In looking into the patient's mouth the secretions from the nose could be readily seen; also, the turbinate bones and the antro nasal wall were all exposed to view. This operation was done without any inconvenience to the patient except for about a minute at the last. He lost considerable blood and was confined to his bed about a week.

The patient has only the second and third molars on the upper. They were so loose that we did not feel that they could be saved, we took a chance and succeeded in saving these, and fortunate it is for it is the only hope for an attachment for an appliance that must be later worked out to prevent food and liquids getting up into the nose and antra. The patient had been under treatment two months, had gained in weight and is enjoying good health, which he had not done for seven years. After the operation vaccines were used to prevent, if possible absorption into the blood of toxic products.

IMPACTED MOLAR.

Before operation the mouth should be in as hygienic state as possible.

After the tissues have been anesthetized the gum on the buccal surface is separated from the tooth as far down as possible by use of elevator, being careful not to tear the gum tissue.

Several long shank burs are used, starting first with smallest size; the bur should not be forced too hard, but allowed to drill on buccal surface with long axis of tooth.

Care should be taken not to allow bur to penetrate the inferior dental nerve, as this frequently causes weeks and months of suffering and can generally be avoided.

This operation is done invariably under local anesthesia, the more difficult the case the greater need for local anesthesia.

The patient is placed in an upright position so that the day-light can be reflected into the area required. The patient is able to assist by frequently clearing the mouth and throat of blood, thereby lessening the amount of swabbing; it also prevents the possibility of respiration of blood into the lungs. As the operation is painless, I personally do not see the need of jeopardizing a per-

son's life directly or indirectly by the administration of a profound anesthetic.

Nerve blocking is of special value in these cases; 5—7 minims of adrenalin chloride 1/1000 is usually sufficient to arrest excessive hemorrhage.

ROOT AMPUTATIONS OF TEETH.

Caution was advocated in the amputation of teeth roots. Six anterior teeth, upper and lower, as a rule can be amputated quite successfully with a good prognosis provided judgment is exercised in the interpretation of the radiograph. One reason why it is not safe to operate on teeth roots in the upper jaw is on account of possibility of causing infection of the Antrum. However, bicuspid roots occasionally might be operated when not too close to the floor of the Antrum.

Amputation of bicuspids in the mandible often causes injury to the inferior dental nerve. The same is true of teeth with long roots. It is well to forget about amputation of roots of these teeth; or if there is a sufficiently diseased area in the region of the molars, it is better to extract.

THE PORCELAIN MOLAR CROWN USING A GOLD BASE AS ATTACHMENT TO ROOT.

By Harold E. Rice, D. D. S., Detroit, Mich.

(Read before Michigan State Dental Society April, 1917.)

The object of this clinic is to bring before those present, not something new but a practical method of eliminating the gold shell crown on the upper first molars, in cases where the bite is evenly balanced and most of the other teeth present.

The root is prepared V-shaped, buccolingually, this preparation taking care of the bucco-lingual strain to a large extent. After the root canals are filled the upper portion of the pulp chamber left open allowing the base to be swaged down into it, which helps take care of the torsional strain and gives a cup-shaped depression which allows of a better soldered joint between post and cap.

A copper band that fits the root is then made and an impression taken in modeling compound. From this an alloy die is made. Using this die and a piece of thirty gauge pure gold, swage, trim and then reswage and burnish the margins down with a burnisher. Place in the mouth and force post thru into place. The post used is fourteen gauge iridioplatinum and the palatine root is used for post hole. Remove, invest and solder with twenty-three Karat solder.

Place back in mouth, take a Trubite diatoric tooth a little wider mesio-distally than is indicated. This allows of grinding for approximal contacts. If this isn't possible the contacts can be backed on very quickly.

Grind for bite, deepen central hole for Goslee post and grind the base of tooth as much like a Goslee tooth as possible.

To this swage thirty four gauge pure gold and trim. Remove cap and post and stick both parts together with sticky wax. Warm slightly and put in mouth and adjust to bite. Remove from mouth; remove porcelain tooth, invest and solder.

On account of the small amount of soldering surface mesially this crown is not

applicable for bridge work, and should a porcelain faced tooth be indicated for bridge work, prepare root as above and use same technic for base and post. Grind long pin facing to bite, back up with thirty four gauge pure gold, carve up crown in inlay wax, and cast direct to base.

This crown is only applicable to a small percentage of cases depending on the individual habits of patient, care taken of mouth, force of mastication, number of teeth present and should warrant a fee commensurable with services rendered.

THE APPLICATION OF PHOTOGRAPHY TO DENTISTRY.

By Samuel J. Lewis, D. D. S., Kalamazoo, Mich.

(Read before Michigan State Dental Society April, 1917.)

This clinic illustrated the use of photographs of operations in and about the mouth in keeping permanent records. Photographs of plaster models, faces, appliances in the mouth, palates, etc., were shown, illustrating how detail could be had by proper focusing. The method of focusing used was placing a cover glass in the ground glass, and using a magnifying glass with which to see the object. The clinician explained that in taking pictures in the mouth where high lights are present, the camera should be stopped down, and the exposure should be long, but where faces are to be taken, the camera should be open, and the exposure short. Also, in taking pictures of plaster the light should be subdued, the lens stopped down, and the exposure long. And in taking pictures of the palate, reflected light should be used, with a stopped lens, and long exposure.

Society Work ---New Plans

OKLAHOMA STATE DENTAL SOCIETY.

The Program Committee of the Oklahoma State Dental Society is carrying out a decided innovation in the educational plans for a State Society meeting. The Oklahoma method of conducting a post-graduate course of study at their State Society meetings, as inaugurated several years ago, has established a new precedent in the conducting of State Society work. However, this proved to be such a decided success that many other State societies have followed, to their advantage, the Oklahoma method. The plan, as outlined in the letter below, would seem to indicate a decided improvement over their former "Post-Graduate Dental Meeting—this new plan more thoroly systematizes or standardizes the teaching course, so that the individual member may receive in this one week's intensified study the specific work, that he may need to better fit him for his particular professional work. The Editor would urge that other State Society officers, thoroly study these plans and see if from them, they may not be able to inject new life into their annual dental society meetings. The Journal of the National Dental Association has had reprinted "The Post-Graduate Dental Meeting," by C. R. Lawrence, D. D. S., and "A State Society's Aim: Making Efficient Dentists," by Otto U. King, D. D. S., these two booklets will be mailed, upon request to any member, upon receipt of 5c in stamps—Editor.

PROGRAM COMMITTEE'S LETTER.

Enid, Oklahoma, October 4, 1917.

Dear Doctor:—At the last meeting of the Oklahoma State Dental Society it was voted, almost unanimously, to adopt a new plant for the conduct of our meeting next year.

This plan, briefly explained, is to organize our full attendance into classes and have the members of each class devote their whole time to the study of one subject under a competent teacher, this subject to be the one of your choice. By devoting our entire attention to one subject for a full week, every one will learn a great deal more than if his time were divided among several subjects.

The idea is to give every member entered in these special classes, individual and practical training. For instance, you wish to take up the subject of full dentures, you will be required to construct a full upper and lower denture along modern lines, under the supervision of a competent teacher. If you select partial dentures, removable bridge work, X-Ray or root canal work, nerve blocking, or any other subject in dentistry, you will, in so far as possible, be given an opportunity to receive practical and personal training along this line.

Each class will contain a limited number of students, so that there will be no crowding and every member of each class will be given an opportunity to grasp each point as presented.

There will be one or two general lectures each day. This will give the mem-

bers of each class an opportunity to learn something along lines other than the class in which they are entered. No one will be permitted to take up more than one subject unless he wants to pay the special fee for each class.

The problems in dentistry are now so big and broad that we can no longer afford to go along and not become more proficient, and this we can do by more detailed study and work. Not many of us can afford the time and money necessary to go to these special instructors, so the Oklahoma State Dental Society has set out upon a task whereby they are going to give its members an opportunity to derive the very best possible advanced, practical training in dentistry —and all this at a minimum cost in time and money. We believe the membership will support this movement, just as they so liberally and generously supported the first Post Graduate lecture course.

THE FIRST STEP.

The first step in the success of this gigantic undertaking, is to receive your cooperation at every stage of the procedure, and with this object in view, we are enclosing a card with all the principal subjects listed on it, and you are requested to mark the subject in which you are most interested. We want each person to make a first, second and third choice. This is necessary because in our first canvass there may be, say five members who wish to take up Oral Surgery, and in that there will not be enough members for a special class, and these men will then be requested to enter a class of second choice.

For example, mark your card this way.

Full dentures.....1

Nerve Blocking and Anesthesia.....2

X-Ray and Root Canal Work.....3

THE COST.

At this time it is impossible to state what the membership fee will be for each class, but the committee is of the opinion that the work can be carried thru on a basis of twenty dollars per member. Whatever the amount, it will be much less than you can secure the same instructions from these special teachers under different circumstances, many of whom charge from fifty to one hundred dollars, and in addition to this you will be saving several dollars in railroad fare and other expenses. A certificate of attendance will be issued to the members of each class.

NOW THEN,

If this plan appeals to you and you wish to support it, you must "do your bit" right now, by indicating on the enclosed card (See card No. 1) whether you will support the movement. If enough favorable replies are not received within a very short time to warrant the committee to go ahead and lay their general plans, the whole thing fails. These replies should be returned within the next few days, as it is our desire to classify them immediately.

CARD NO. 1.

Full Dentures	
Anchor Dentures and Removable Bridgework	
X-Ray Root Canal Work and Focal Infections	
Nerve Blocking and Anesthesia	
Operative Dentistry, Crown and Bridgework, Jacket Crowns, Etc.	
Exodontia-Root Amputation and Oral Surgery	
Orthodontia	
Pyorrhea-Prophylaxis-Materia Medica	
War Dental Surgery	
General Subjects (Mixture)	
Office Assistants (Lecture and demonstration for assistants only)	
For Any Subject Not Listed	

Name .....

Address .....

Date.....191....

Legislation and Enrollment

[PUBLIC—No. 86—65th CONGRESS.] [H. R. 4897.]

"An Act to provide for the promotion of first Lieutenants in the Regular Army and National Guard to the grade of captain, and respecting the Dental Corps of the Army and medical and dental students, and for other purposes.

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That during the existing emergency first lieutenants in the Medical Corps of the Regular Army and of the National Guard shall be eligible to promotion as captain upon such examination as may be prescribed by the Secretary of War.

"Hereafter the Dental Corps of the Army shall consist of commissioned officers of the same grade and proportionally distributed among such grades as are now or may be hereafter provided by law for the Medical Corps, who shall have the rank, pay, **promotion** and allowances of officers of corresponding grades in the Medical Corps, including the right to retirement as in the case of other officers, and there shall be one dental officer for every thousand of the total strength of the Regular Army authorized from time to time by law: Provided further, That dental examining and review boards shall consist of one officer of the Medical Corps, and two officers of the Dental Corps; Provided further, That immediately following the approval of this Act all dental surgeons then in active service shall be recommissioned in the Dental Corps in the grades herein authorized in the order of their seniority and without loss **of pay or allowances** or of relative rank in the Army: And provided further, That no dental surgeon shall be recommissioned who has not been confirmed by the Senate.

"All regulations concerning the enlistment of medical students in the Enlisted Reserve Corps and their continuance in their college course while subject to call to active service, shall apply similarly to dental students.

"Approved, October 6, 1917."

The above is a verbatim copy of Public Document No. 86, issued by the Government, except the underscoring of the five words hereinafter explained. The Dental Amendment commences with "Hereafter" and is a modification of the legislation introduced by Senator Lodge, and which was known to the dental profession as the "Lodge Dental Amendment." Unfortunately, Senator Lodge left Washington about two weeks before Congress adjourned and requested Senator Pomerene to take charge of our legislation. Inasmuch as considerable opposition had developed along certain lines, together with the fact that some of our

friends strongly advised us to both modify and shorten our amendment, we did so in two particulars and placed this in the hands of Senator Pomerene a few days before Congress adjourned. Our understanding was that he was to vigorously push this in the event H. R. 4897 came before the Senate for consideration.

First, the modification was by adding the underscored words which were thought by many to be of vital importance. The second was the striking out of the two following provisions:

"Provided, That all laws relating to the examination of officers of the Medical Corps for promotion shall be applicable to officers of the Dental Corps: And provided further, That first lieutenants in the Medical Department shall be promoted to the grade of Captain upon the completion of three years' service in that grade in the Medical Department and upon passing the examinations prescribed by the President for promotion." These two provisions were eliminated owing to existing conditions which made them of no particular value.

The last two provisions in the legislation as enacted were presented and agreed to when the amendment was before the senate for consideration. I do not understand the first one of these sufficiently to make any comment at this time, except that it would seem to be out of place. The second one is very important and adds another link to our contention for "equal status."

No disappointment should be occasioned because the Dental Reserve Corps is not specifically referred to; however, this new legislation automatically provides the same grades for our Reserve Corps members as are provided for the Medical Reserve Corps. That is, the grades of lieutenant, captain and major. Thus we secured two additional grades, as we had the grade of lieutenant in the Reserve Corps under the provisions of the National Defense Act, June 3, 1916. Naturally the higher grades will be limited in number, but should be proportionately distributed in harmony with those of the Medical Corps.

Respectfully submitted,

HOMER C. BROWN, Chairman,
Legislative Committee, N. D. A.
609 Hartman Building, Columbus, O.
October 17, 1917.

MEDICAL CORPS PROMOTIONS AND DENTAL CORPS.

The act to provide for the promotion of First Lieutenants of the Medical Corps in the Regular Army and National Guard to the grade of captain, and respecting the Dental Corps of the Army and medical and dental students was approved by the President on October 5.

The text of the measure follows:

That during the existing emergency First Lieutenants in the Medical Corps of the Regular Army and of the National Guard shall be eligible to promotion as captains upon such examination as may be prescribed by the Secretary of War, and Provided, That hereafter the Dental Corps shall consist of commissioned officers of the same grades and proportionally distributed among such grades as are now or may hereafter be provided by law for the Medical Corps, who shall have the rank, pay, promotion, and allowances of officers of corresponding grades in the Medical Corps, including the right to retirement as in the case of other officers, and there shall be one dental officer for every one thousand of the total strength of the Regular Army, authorized from time to time by law: Provided further, That dental examining and review boards shall consist of one

officer of the Medical Corps and two officers of the Dental Corps: And porvided further, That immediately following the approval of this Act all dental surgeons then in active service shall be recommissioned in the Dental Corps in the grades herein authorized in the order of their seniority and without loss of pay or allowances or of relative rank in the Army. And provided further, That First Lieutenants in the Medical Department shall be promoted to the grade of captain upon the completion of three years' service in that grade in the Medical Department and upon passing the examinations prescribed by the President for promotion: And provided further, That no dental surgeon shall be recommissioned who has not been confirmed by the Senate; and provided further, that all regulations concerning the enlistment of medical students in the enlisted reserve corps and their continuance in their college course while subject to call to active service shall apply similarly to dental students.

Senator Pomerene was responsible for the Senate amendment relating to the Dental Corps. Senators Warren and Overman opposed an amendment of the bill in the Senate on the ground that the House would not accept it in the final hours of the session. Both Senators, however expressed approval of the provisions of the amendment. Senator Pomerene refused to withdraw his amendment and when the matter was taken up in the House it was agreed to after some vigorous protests were made about legislating for a permanent personnel in an amendment having no relation to the subject matter of the bill.

Senator Pomerene, among other things, said:

"The amendment offered by the senior Senator from Massachusetts, which I shall present as an amendment to the bill, affects the dental officers of the Army. It has seemed to me since I have been in the Senate that there has been a disposition, in some quarters at least, to discriminate against the dental profession, but if there ever was a time in the history of this country when the dental profession should be cared for it is now, because of the method of trench warfare which is in vogue in Europe today. Many of the injuries sustained by soldiers are to the face and the mouth, and the work which is done by the dental profession has commended itself to the admiration of the world.

"I do not like to look upon dental surgeons as if they were a separate and distinct profession. It seems to me they are specialists in one branch of surgery, and if we are going to do what is just to the medical profession—and I am glad the committee is seeking to do that—I shall ask at the same time that there be a modicum of justice extended to the dental profession. For that reason I shall offer this amendment if the Senate takes up the bill for consideration."

When the House passed the bill on October 6, Representatives Gordon and Stafford severely criticized the method by which the legislation was brought before the House.

Representative Towner, of Iowa, favored the bill, and said:

"Mr. Speaker, under ordinary circumstances I am inclined to think that many of us would concur in the criticisms that have been made by the gentleman from Wisconsin (Mr. Stafford) with regard to the fact that this amendment has been brought in so late in the session. However, I think the criticisms that are made upon the substantive parts of the bill are not well founded. This matter has been under consideration both in the House and the Senate. It has received the consideration of the committee on military affairs. It has the approval of the surgeon generals' department. There is nothing asked that is extraordinary in its nature or character. We must have these dental officers. They are already provided for. The only question raised here as to whether or not they shall occupy the anomalous position of being a

part of the surgeon general's department, a part of the medical staff, or whether they shall have a distinctive position which shall still be under the surgeon general's department, but which will be separately recognized as a dental department. That, it seems to me, is entirely a matter that ought to be approved by the House, but that is not the most serious question. If we vote down the passage of this bill it will not only kill that provision but it will kill the whole bill. Certainly the provisions of this bill are important enough now that they should be passed at this session. It is an emergency act. Its provisions are important, and we should pass it at this time. I presume there has not been a single bill passed to which objections could not be made."—*Army and Navy Register.*

EXEMPTING DENTAL STUDENTS FROM DRAFT.

War Department,
Office of Surgeon General,
September 4, 1917.

In so far as applicable the attached rules include dental students in their 2nd, 3rd or 4th year. If you have been called, forward form 103, if not, advise your draft number and address of your local board. The Dean's affidavit is required and must state specifically that you are enrolled as a bona fide 2nd, 3rd or 4th year student for the coming school year, 1917-1918.

The following regulations governing the discharge of hospital internes and medical students from draft under the selective-draft law of May 18, 1917, have been made by the President:

"First. Hospital internes who are graduates of well-recognized medical schools or medical students in their fourth, third and second year in any well-recognized medical school who have not been called by a local board may enlist in the Enlisted Reserve Corps provided for by section 55 of the national defense act under regulations to be issued by the Surgeon General, and if they are thereafter called by a local board they may be discharged on proper claim presented on the ground that they are in the military service of the United States.

"Second. A hospital interne who is a graduate of a well-recognized medical school or a medical student in his fourth, third, or second year in any well-recognized medical school, who has been called by a local board and physically examined and accepted and by or in behalf of whom no claim for exemption or discharge is pending, and who has not been ordered to military duty, may apply to the Surgeon General of the Army to be ordered to report at once to a local board for military duty and thus be inducted into the military service of the United States, immediately thereupon to be discharged from the National Army for the purpose of enlisting in the Enlisted Reserve Corps of the Medical Department. With every such request must be inclosed a copy of the order of the local board calling him to report for physical examination (Form 103), affidavit evidence of the status of the applicant as a medical student or interne and an engagement to enlist in the Enlisted Reserve Corps of the Medical Department.

"Upon receipt of such application with the named inclosures the Surgeon General will forward the case to The Adjutant General with his recommendations. Thereupon the Adjutant General may issue an order to such interne or medical student to report to his local board for military duty on a specified date, in person or by mail or telegraph, as seems

most desirable. This order may issue regardless of the person's order of liability for military service. From and after the date so specified such person shall be in the military service of the United States. He shall not be sent by the local board to a mobilization camp, but shall remain awaiting the orders of The Adjutant General of the Army. The Adjutant General may forthwith issue an order discharging such person from the military service for the convenience of the Government.

"Three official copies of the discharge order should be sent at once by The Adjutant General to the local board. Upon receipt of these orders the local board should enter the name of the man discharged on Form 164A and forward Form 164A, together with two of the certified copies of the order of discharge, to the mobilization camp to which it furnished men. The authorities at the mobilization camp will make the necessary entries to complete Form 164A, and will thereupon give the local board credit on its net quota for one drafted man."

* * *

1. It will be observed that paragraph **First** of the foregoing deals with internes and students who shall **not** have been called by a local board, and provides that they may enlist in the Medical Enlisted Reserve Corps under regulations to be issued by the Surgeon General, such enlistment entitling them to discharge from draft if thereafter called.

2. An application for enlistment under this paragraph must be forwarded to the Surgeon General with the affidavit of the applicant, supported by the certificates of his school authorities, showing his present status as interne or student, and particularly how long he has been an interne in the one case, or the year of the medical course that he is pursuing in the other.

3. An interne who has served one year or more as such will not be enlisted in the Medical Enlisted Reserve Corps under this regulation.

4. An interne who is enlisted in the Medical Enlisted Reserve Corps hereunder will be called into active service under his enlistment, if his services are needed, at the end of one year of interneship. Applications for commission in the Medical Reserve Corps, from internes who at the expiration of one year's interneship are called for duty as members of the Medical Enlisted Reserve Corps, or from internes whose year of interneship is about to expire, will receive proper consideration.

5. A medical student (undergraduate) who is enlisted in the Medical Enlisted Reserve Corps hereunder will be called into active service under his enlistment, if his services are needed, upon failing to pass from one class to another, or upon failing to graduate.

6. The **Second** paragraph above quoted deals with internes and students who **shall have been** called for service by a local board under the selective-draft law, and contemplates their discharge from the draft, upon condition that they shall enlist in the Medical Enlisted Reserve Corps.

7. It will be tho policy of the Surgeon General as a rule to recommend discharge from the draft upon the condition indicated, the discharge to be followed by a call to active duty under the enlistment in the Medical Enlisted Reserve Corps at the expiration of a complete year of internship or upon the failure of the student (undergraduate) to pass to the next higher class or to graduate.

8. Internes and students who are enlisted in the Medical Enlisted Reserve Corps by virtue of these regulations, and are not called into active service under such enlistment, are required to report their status to the Surgeon General as follows: Internes, at the end of each three months' period, **such** report to show the total amount of interneship

since graduation, and to be countersigned and attested by the Medical Superintendent of the hospital; students, at the end of each semester, such reports to show whether the students qualified for advancement, and to be countersigned by the deans of their respective schools or by subordinate officers representing the deans.

9. In the execution of these regulations the Department will not recognize interneships in hospitals, sanitariums or other institutions conducted for profit, or in small private hospitals (50 beds or less), or new interneships established or added since May 18, 1917, to those previously existing, at any hospital, excepting such as may have been newly established and added by reason of a proportional increase in the bed capacity of such hospital; nor will it recognize interneships in the case of any graduate appointed thereto later than August 1, following his graduation.

By order of the Surgeon General:

ROBERT E. NOBLE,
Lt. Colonel, Medical Corps.

ARMY DENTAL CORPS.

No action will be taken on the new legislation, enacted on Saturday in relation to the Army dental corps, the text of which law is published in full elsewhere in this issue, until the judge advocate general's opinion as to the construction of the statute is approved by the Secretary of War. Such interpretation has been asked by the surgeon general. If it be considered that the enlisted strength, which will be the basis of numbers and the proportion in grades, is 300,000, there will be, of course, 300 officers of the corps and as nearly as may be determined now this will serve to create nine colonels, sixteen lieutenant colonels, 71 majors, and 203 captains and first lieutenants. Promotions will be made by seniority.

Commissions are being prepared this week for 60 officers recently appointed to the regular dental corps, the announcement of the qualification of whom was contained recently in the columns of the Army and Navy Register.

There will be no more examinations of applicants to the dental reserve corps for the present. There is now a sufficient number of dentists enrolled to care for an Army of 3,000,000 men, or about three times as many as would be called to the colors at this time.

There are two exceptions made to the above mentioned discontinuance of examinations:

First, since this department will have need of certain dental specialists in various locations in this country and abroad, applications will be considered of such men as are especially well qualified in such branches as the needs of the Army may demand. The dental specialists needed at this time are to be found among those who have had experience in the management of fractures of the jaws, and in minor or major oral surgery. Applications for appointment in the dental reserve corps, will, therefore, be considered of men qualifying in the work above outlined.

Second, when a dentist is drafted and has been physically accepted by those in charge of the camp where the dentist has been sent as a private, he may then make application for appointment in the dental reserve corps thru the proper channels

to the dental surgeon there in charge, who will promptly have completed papers sent to this office for final action, when an additional number of dental officers are required.

Applications already received will be placed on file and the applicants informed when the examination to the dental reserve corps are resumed. — *Army and Navy Register.*

RESOLUTIONS PASSED BY THE NORTHWESTERN DISTRICT DENTAL SOCIETY OF NEBRASKA.

WHEREAS, our Senator, Gilbert M. Hitchcock, and our Congressman, Ashton C. Shellenberger, have been instrumental, both by their personal work and their votes, in the passage of the Lodge Amendment to House Roll No. 4897, wherein the dental profession has been recognized by increased rank and privileges in the army, and placed on an equal rank and basis with the medical profession, and

WHEREAS, we desire to express to said members of Congress our appreciation of their work and services,

THEREFORE, BE IT RESOLVED by The Northwestern District Dental Society of the State of Nebraska, now in session at Hastings, Nebraska, that we do hereby tender to them our sincere appreciation and gratitude for the service in our behalf so performed.

BE IT FURTHER RESOLVED, that a copy of this resolution be sent to our said Senator and Congressman, respectively, and that a copy hereof be sent to the Nebraska Dental Journal and to the National Dental Journal of America for publication.

E. A. MESENEY, Pres.
F. H. WELDEN, Sec.-Treas.
S. A. ALLEN,
Pres. Neb. State Dental Society.
H. E. KING,
Sec. Neb. State Dental Society.

THE MEDICAL OFFICER AND HIS RANK.

The lowest rank held by a medical officer is that of first lieutenant. As such he is entitled to salute by second lieutenants, sergeants and corporals, as well as by privates of the line. If there is anything that "gravels" even a second lieutenant it is this demand of the service. At one of the training camps for officers of the line and for medical reserve officers, the latter have become accustomed to the somewhat satrical salutes and gibes of the embryo line officers. The "medics" retaliate by good-natured advice to the "boy-scouts." One of the students in the line training camp said: "The hardest thing we have to do is to salute those fellows (the medical officers). They can't march, they salute funny and they are not soldiers anyway you look at it." The attitude of these men who may some day be in a position to reject a suggestion of immense sanitary importance from the men who now amuse them is significant. Perhaps the cure for the problem lies in teaching the line officer the deeds of the medical department in the past, in impressing on him the lessons of the Mesopotamia tragedy, in convincing him that the greatest sacrifice on the alter of duty to one's country is made by the medical officer.— *The Journal of the A. M. A.*

CONGRESSMEN DYER, IGOE AND MEEKER ENTERTAINED BY ST. LOUIS DENTISTS.

Congressmen Meeker, Igoe and Dyer were tendered a dinner last night at the American Annex by the St. Louis Dental Society in recognition of services rendered by them in obtaining the passage of the Lodge amendment, as amended by Senator Pomerene, placing the Dental Corps on an equal footing with the Medical Corps. More than 350 members of the dental fraternity attended the dinner and listened to speeches made by the congressmen.

Dr. V. N. Pippin was toastmaster. He introduced Congressman Meeker, who responded by denouncing the kaiser and kaiserism. He told his hearers that the kaiser relied on the good nature of Uncle Sam to stay out of the war. "But he made a mistake," he continued, "and that mistake is going to prove the end of kaiserism."

Congressman Dyer brought the men to their feet when he told them: "I am a Republican in politics, but there is only one country, one flag and one president."

The honorary guests were: Capt. S. D. Boak, Lieut. William C. Webb, Capt. Gunckel of the regular army, and also the Dental Reserve officers in St. Louis now awaiting orders. Short talks were given by the honorary guests.

THE CANADIAN ARMY DENTAL CORPS FOR WAR TIME ONLY.

What is a fact might just as well be admitted and known to the whole profession. For a long time it was hoped that two or three matters of vital importance to the C. A. D. C. would be adjusted without publishing the whole situation. At the present time there is really no permanent dental establishment. If the war closed today there would be no dental corps.

The situation is about like this: When a committee of the Canadian Dental Association interviewed Sir Sam Hughes on the matter of a dental corps he said there would be established an independent organization with its own staff, and responsible only to the A. G. There was much opposition to this in the militia council, and it appears that while a complete working organization has gone on for almost three years on this basis there has not been passed what is known as a general order covering the establishment. Without this general order the C. A. D. C. ceases with the war. One would naturally think that what has existed for the full period of the war, and shown its usefulness in the training camps, the field, the hospital and the soldiers' homes would have had some permanent basis to work upon. The difficulty is the A. G., the deputy minister and the Surgeon-General who are members of the militia council have been opposed to the minister's views and have been able to thwart every move in this direction.

As a direct result of this situation and the power these officers can wield both here and overseas the Canadian dentist is not permitted to go to France with the Canadian soldier. The establishment works out all right in the camps in Canada where the direct control comes from Ottawa, but in England we are informed there is much difficulty and opposition from the medical corps.

All the Canadian dentists who are serving the soldiers in France are drafted into

the Army Medical Corps. It would seem that there are not nearly enough dentists in France to serve the soldiers there, because the mouths of the returned soldiers are in a shocking condition from dental neglect.

Since few recruits have been going to England, and those who were there have gone to France, some of the dental officers in England have been sent home and the sergeants drafted into other units in the face of the fact that Canadian soldiers in France are receiving very inadequate dental services.

It is quite natural for the A. M. C. to oppose an independent dental corps, becauses for many years the dentists were members of the medical corps, and besides, the medical man was first on the ground, and wishes to include under him the surgeon, the dentist, the nurse, the veterinary, the sanitary scientist and the druggist, and everybody else who will submit to his governing instincts. Few would object if members of any of these organizations might become a director-general or a surgeon-general. There is always a limit to which an officer of any of these ranks may attain. They may not go to the top.—*Dominion Dental Journal.*

DENTISTS AND MILITARY SERVICE IN ENGLAND.

In view of the coming into effect of the Military Service Act of Canada, it is of interest to know how the Act works out in Great Britain in regard to dentists. It would seem that all dentists have been called for service, and if they were under 35 years of age they must serve, but recently the following conditions prevail:

"The Army Council have agreed that applications for exemption by dentists whose names appear on the Register for 1917, and who are in actual practice, are to be dealt with by Tribunals on their merits, with due regard to the danger of further reducing the number of dentists and the requirements of the places where the applicants practice. If the Tribunal refuses exemption the man is to be available for service if on January 1, 1917, he was under 35, and has, since May 25, 1916, been classified A. A man who was 35 or over on January 1, or, whatever his age, has not been classified A, will not be taken for service otherwise than in his professional capacity, provided that he puts himself at the disposal of the Dental Service Committee. Tribunals can grant exemption to such men on the condition that they offer their services to the Committee. The Committee will contain representatives of the British Dental Association, a medical representative, and representatives from the Government departments principally concerned. Any man who has been granted the conditional exemption above referred to should communicate with the Secretary of the Dental Service Committee, 19 Hanover Square, London, W. 1.—*Dominion Dental Journal.*

Army and Navy

DENTAL CORPS ORDERS FROM WAR DEPARTMENT.

DENTAL CORPS.

1st Lieuts. Albert S. Cumming and Harry E. Smalley to Syracuse (N. Y.) reorganization camp.

1st Lieut. Hugh M. Tarpley to Fort Monroe for duty.

1st Lieut. Harold E. Albaugh to Chillicothe, Ohio, Camp Sherman, for duty.

Capt. George H. Cassaday from Douglas, Ariz., to Camp Funston, Fort Riley, for duty in charge of dental personnel and property.

1st Lieut. Ben H. Sherrard to Chillicothe, Ohio, Camp Sherman, for temporary duty in charge of dentists and dental property.

The following to camp for duty in charge of dentists and dental property: 1st Lieuts. Rex McK. McDowell, Garden City, Long Island; Herman S. Rush, Waco, Tex.; Minot E. Scott, Anniston, Ala., and Frank L. K. LaFlamme to Camp Meade, Annapolis Junction, Md.

Capt. S. Davis Boak to St. Louis, School of Plastic and Oral Surgery, Washington University, for instruction and return to his proper station.

The following proceed to United States and report to surgeon general of the Army for duty: Capt. Wm. H. Chambers and 1st Lieut. Albert R. White.

1st Lieut. Chester Denham to Camp Taylor.

1st Lieut. J. C. King from Canal Zone to surgeon general's office.

DENTAL RESERVE.

1st Lieut. James T. Cannot to Gettysburg, Pa., for duty.

1st Lieut. Lewton E. Erwin to Fort Oglethorpe for duty.

1st Lieut. George C. Booth to Fort Des Moines for duty.

Following to Camp Devens, Ayer, Mass., for duty: 1st Lieuts. Stanley H. Baldwin, Fay T. Bowen, Myers Brownstone, Gregory P. Cassidy, William B. Cobb, Maurice D. Corrigan, Joseph M. Creegan, Frederick W. Day, James F. Dobson, Nathan H. Finkelstein, Carolus R. Given, Walter Grandage, Thomas F. Greene, Thomas J. Guilfoil, James B. Herrington, Harvey L. Haskell, Oswald W. Holmes, James H. Keith, Paul O. Kluttig, Michael Krall, Harold J. McGinn, Ralph H. Metters, Thomas B. O'Leary, Thomas E. Power, Ralph B. Putnam, Norman C. Spencer, Harold A. Stone, Harold L. Stover, Chester H. Tannebring, John E. Tyler, Edmund M. Webb, Virgil A. Widdoes, William G. Williams, Louis Witz, and James F. Wynn.

1st Lieut. Roy G. Strickler to duty with 5th New Jersey infantry, Pompton Lakes, N. J.

Following to Presidio of San Francisco for duty: 1st Lieuts. Lester C. Hunt and William W. McCrillis.

Following to camps for duty: 1st Lieuts, Kent W. Phillips, Camp Sevier, Greenville, S. C.; 1st Lieut. Herbert R. Boyd, Camp Lee, Petersburg, Va.; 1st Lieut. Harry W. Donovan, Camp Gordon, Atlanta, Ga.

1st Lieut. Edward F. Rabe, Camp Gordon, Atlanta, Ga.

1st Lieut. Lucius A. Butler to Fort Des Moines for duty.

1st Lieut. Robert W. Hammons to Camp Gordon, Atlanta, Ga., for duty.

1st Lieut. Ira D. Funkhouser to Fort Benjamin Harrison for duty.

Following to Jefferson Barracks for duty: 1st Lieuts. Mendsay M. Dexter and Orlin C. Stuart.

Following first lieutenants to camps indicated for duty:

To Camp Lewis, American Lake, Wash.: Waldo J. Adams, Adolph A. Anderson, Melville C. Babington, Harry E. Bengtson, Nona P. Bennett, Earl O. Billings, Ernest D. Buettell, John L. Burnside, Munn Q. Cannon, Henry J. Carleton, Hubert F. Christianson, Ray F. Cole, Walter E. Cole, Leon B. Collier, Charles A. Couplin, Franklin C. Dallimore, Wooster H. Fisk, George L. Gallagher, Solomon J. Z. Gantz, Howard A. Hale, George R. Heap, Charles S. Irwin, Orlando J. Johnson, John B.

Kennedy, John A. Kimmel, Winfred P. McDaniels, Thomas G. McMartin, George A. McMonagle, Ralph I. Mills, Conrad E. Mortensen, Melvin O. Nelson, Benjamin F. Pound, Seymour S. Skiff, Harold D. W. Pineo, James L. Roark, Lief Norman Tommerson, and Lyman F. Wagoner.

To Camp Lee, Petersburg, Va.: John S. Allen, Edward A. Beddoe, Francis J. Canning, Albert Cartun, Carlyle B. Cleland, L. N. Cooper, Burton A. Courtright, Aaron R. Crane, Harold F. Doyle, Frank P. Gormley, Thomas A. Holton, Frank O. Hood, George McC. Kiner, Victor P. Klapacs, Theodore E. LaFayette, jr., Harold R. Lamb, Ernest R. Lathan, Leonard E. Loveridge, Robert R. Luce, Daniel F. McCarthy, Arthur B. McCormick, John H. MacDermott, Wilber H. Morrill, Louis Olin, Joseph H. Parsons, Harry E. Petterson, Frank D. Pierce, George A. Rigg, John J. Ross, James E. Ryan, Alexander Schwartz, Walter F. Sullivan, Crester Sutch, and John B. Williams.

To Camp Meade, Annapolis Junction, Md.: Melvin M. Augenstein, Harry P. Bachman, Daniel T. Bowers, William O. Boss, Edward S. Bracken, jr., Leigh H. Breisch, Charles L. Cassell, Charles H. Clairborne, jr., Harry W. Deegan, Charles G. Dentry, jr., Hubert H. Elslager, David G. Everhart, Robert F. Fox, Samuel Friedlander, Thomas H. Harding, Charles P. Hatrick, Sidney C. Hoffman, Marcus C. Horning, Hervey C. Manon, Jerome B. Marshall, John C. McElhaney, Paul T. Nelson, William B. Noble, James L. Olsen, Edwin J. Reichel, Harry B. Riley, Eli B. Rosser, Louis Rossman, Rumsey F. Rowdybush, John G. Shaffer, John G. Showalter, John W. Snyder, Donald S. Sterrett, and Howard E. Swartz.

To Camp Dix, Wrightstown, N. J.. Charles J. Balbach, Frederick F. Bruch, William G. Buchanan, Lawrence F. Campbell, Joseph A. Colman, Bernard J. Connolly, jr., John F. Connolly, Howard M. Davis, Paul J. Delong, Herbert Dewar, Robert A. Dewitt, Frank E. Dougherty, Frank J. Ernest, John A. Flood, Jesse B. Gearhart, Charles T. Gilden, jr., Ralph E. Gill, Guy L. Haman, Clarence H. Hapgood, Thomas F. Healy, Geo. A. Hussey, jr., Walter E. Lotz, William R. Lutz, William E. McCain, Louis McMaster, Ray M. McNulty, William H. March, Albert Mehrer, Allen L. Murphy, Robert E. Price, Fred H. Swanson, Thomas H. Travilla, Richard J. Walsh, Philip H. Woods, and John I. Wyckoff.

To Camp Upton, Yaphank, Long Island: Carl G. Anderson, Roscoe L. Barber, Howard F. Berkey, Frederick H. Brophy, Gerald G. Burns, Harry B. Butler, Claude R. Christopher, James L. Clements, John L. Davis, Herman G. Ebling, Cecil G. Fletcher, Charles W. Frieman, Isidor Girsdansky, Leslie A. Gould, William E. Graf, Foster F. Harrower, Harry G. Hindes, Charles W. Hlavac, William E. Jenney, Ralph F. Krueger, Victor Lekowski, Harold J. Loomis, John Mann, jr., George C. McMullen, Joseph J. Millard, Eldorus H. Palmer, Arthur C. Roblin, Fernando E. Rodriguez, John W. Schelpert, jr., Isadore Shapiro, and George G. Starke.

To Camp Jackson, Columbia, S. C.: George N. Abbott, Joseph A. Ahern, Edwin C. Baker, David S. Bedrick, William M. Bergen, Preston M. Blanton, Norman E. Boylston, Chester K. Brown, Louis H. Cadorette, George V. Cannon, Irving P. Carr, Wilbur A. Charron, William A. Connelly, Joseph A. Corriveau, James E. Cox, William L. Davidson, Charles A. Forbush, Louis A. Haffner, Melville W. Haynes, and Aaron LaF. King.

To Camp Wheeler, Macon, Ga.: Kyle B. Alsobrook, Isaac H. Archer, Isaac O. Bishop, jr., Harry T. Bledsoe, Mathew A. Boykin, Henry C. Carver, Owne L. Chestnutt, Herman W. Cook, Thomas Crenshaw, jr., Henry G. Fain, Frampton W. Farmer, Judge W. Fowler, Josiah B. Game, jr., William G. Geffcken, Robert L. Hart, Marion C. Izlar, Paul K. McGee, Hope H. Payne, Idus W. Shields, George F. Waldo, W. Chester Wall, and Clarke B. Weeks.

To Camp Shelby, Hattiesburg, Miss.: William McC. Armantrout, Troy L. Babcock, Raleigh F. Benham, Roy L. Bodine, Frank W. Boville, Milo Bushong, Geo,. H. Carberry, John T. Cosler, Louis M. Daum, Samuel H. Davis, Reginald L. Felton, Douglas D. Godwin, Harry F. Gravelle, Edgar T. Haynes, Melvin H. King, Chester K. Little, Otho L. McKay, Hale H. Pearsey, Earl Robbins, Harold C. Roberts, Glen B. Ross, Mark J. Rozelle, William J. Stark, Edgar Welsh, Raymond H. Williams, and George A. Withrow.

To Camp Dodge, Des Mones, Iowa: Fred C. Allender, Donald D. Cornell, E. E. Courtright, Harry E. Cunningham, Arentz J. Ericson, Max C. Frazier, Clint H. Harrison, Harvey B. Haselton, Gerrit H. Hospers, Charles F. Huber, Claude L. Hunsicker, Peter P. Laude, Gordon B. Logan, A. M. Mauer, James W. McGuire, George W. Mikulas, Lumir M. Mikulas, William O'Neill, Thomas L. Rice, Paul W. Richardson, Stanton L. Sherman, Roy S. Sommers, James C. Standton, Emory O. West, and James E. Wright.

To Camp Taylor, Louisville, Ky.: Finnie E. Crawford, Abraham R. Adams, Walter J. Allison, Julius Altman, James E. Bailey, William J. Barto, Howard Bock, Arthur E. Brown, Clement R. Ellis, DeForrest W. Ewing, Roy D. Gabbert, William H. Hatcher, Roy H. Kernohan, Cameron E. Lane, John O. Lessig, Alevie R. Livermore, jr., Bernard B. Lowdenback, Howard R. Ludwig, Charles A. Mallon, David P. McQuillan, jr., Charles P. Mayhall, Edgar J. Moore, Louis M. Nelson, James F. Owen, William R. Russell, Joseph F. Sheridan, Leo Shonfield, James G. Steiner, Delmar H. Stocker, Sylvester H. Straessley, Oscar W. Thompson, and Andrew B. Waddle.

To Camp Sherman, Chillicothe, Ohio: Clarence F. Berry, Robert A. Buchman, Raymond F. Coleman, Ray C. Comstock, Rozelle M. Cope, Edw. K. Corwin, Milton J. Damlos, Carl K. Denbow, George W. Derks, William A. Earton, Max F. Gruber

James F. Hannon, Frank F. Happy, Starling E. Kay, Claude M. Kemper, Ormsby Keselring, Benjamin J. Light, Ralph D. Linn, Edward B. Lodge, Earl D. Lowry, Edward L. Markley, Edwin Miller, John J. Miller, Henry M. Morrison, Ray W. Osborn, William F. Palmer, William E. Park, Henry D. Rand, James H. Reid, and H. Elwood Schedine.

To Camp Grant, Rockford, Ill.: Robert A. Adkins, Emil L. Aison, Albert M. Aronberg, Ralph Burkhart, Paul W. Clopper, Clyde E. Duncan, Geo. L. Felcher, Frank Willis Gale, John C. Gallagher, John P. Garriott, Harlan E. Haines, Charles H. Hatch, Elmer A. Heinz, Harry W. Hennis, Otto Kolar, Stanley B. LaDue, Creighton L. Lane, Jesse L. Meredith, Herbert R. Newton, Clayton A. Patterson, Perry H. Plummer, Jerome A. Rapp, Kenneth F. Smith, E. F. Sullivan, and Arthur C. Wood.

To Camp Funston, Fort Riley: Arthur P. Alexander, Olly C. Ammons, Robert J. Ballinger, Charles F. Barr, William E. Beard, Clifford W. Bogan, Maurice A. Case, Thomas J. Cassidy, Glenn R. Chafee, Daniel N. Colburn, Vern L. Cowan, Benjamin H. Crawford, Vernon W. Davis, Henry W. Ernst, Arch G. Fee, Archie C. Gottenborg, Alfred F. Groebner, Newton C. Gunter, Meredith E. Helm, John A. Jumer, Edmund F. Lieb, Frank F. Logan, Albert C. Maxwell, Francis P. Meany, John C. Metcalf, James T. Moffitt, Earle W. Nelson, Francis H. Prosser, Leon M. Radke, Clyde W. Scogin, Robert O. Smith, Oscar L. Whitson, James C. Williams, Jonas T. Williams, jr., and Harry W. Wilson.

To Camp Custer, Battle Creek, Mich.: Lawrence E. Aldrich, Robert M. Allen, William R. Beattie, Sperry B. Claypool, Robert L. Donaldson, Grove W. Dunham, Albert W. Farley, Howard W. Geiger, Warren E. Guerrier, Frank L. Hardy, Chauncey H. Jones, Luzerne G. Jordan, Lyman L. Jones, Clarence P. Landgrebe, Cornelius Locke, William C. Melvin, Will W. Mitchell, Walter B. Reeves, Louis E. Reif, Arthur H. Schallheim, Herbert J. Schiewetz, Roy A. Stout, Glenn A. Showerman, Shubael C. Stratton, George P. Taylor, Albert E. Thornberry, jr., Harold J. Thorne, Jay Clinton Thuman, Clair U. Walker, Harrison B. Wall, and Marcus J. Wielage.

To Camp Logan, Houston, Tex.: Milton H. Anderson, Raymond V. Brandt, William D. Burns, Robert G. Carper, Nathan S. Chapman, Victor Y. Coulter, Joseph A. Cullen, Charles E. Davis, Harris B. Frampton, Charles S. Greusel, Fred W. Hoffman, John J. Holland, Harry L. Leedham, Warren E. MacGregor, Harold H. Miller, Ira B. Mowry, William M. Nesler, Fritz A. Pierson, James F. Purney, Ralph A. Sears, Walter Sorenson, Denzil B. Walters, and William A. Walzem.

To Camp Travis, Fort Sam Houston,: Egbert E. Baker, Roy E. Barr, Louis Bergeson, Roscoe Bristow, Carver R. Brown, Rex P. W. Capwell, William Z. Carroll, George W. Crook, Harold C. Hillman, Earl O. Kalk, Henri Letord, Clarence I. Lillehei, Chester H. Langley, Albert W. Marshall, Morell D. McKenzie, Melvin A. Miller, Howard M. Morrissey, Arthur H. Nobbs, John E. Olsen, Louis L. Podruch, Harold F. Poser, William L. Smith, Roy E. Wheeler, Odon J. Wilda, Leigh J. Woodworth, and Alex. J. Zimmer.

To Camp Mac Arthur, Waco, Tex.: Leslie P. Ambelang, Albert W. Anderson, Edwin R. Anderson, Ernest G. Borthwick, William E. Boyle, Victor I. Buss, William R. Cashin, Erwin W. Chamberlain, John E. Connell, Joseph L. Cummings, Dennis J. DeMunck, John W. Elbert, Jerry R. Hayward, Arthur A. Hoffman, Archie R. Houns, Paul A. Howell, Franklin M. Huson, Howard D. Mertz, Raymond A. Ross, Rantz E. Snoberger, Floyd E. West, and Walter LeR. Wilson.

To Camp Doniphan, Fort Sill, Okla.: Edward M. Atkinson, George L. Bennett, Jacob W. Chiles, Charles A. DeWolf, Claude E. Frazier, Ed Granger, Porter E. Gray, George E. Halley, Elmer C. Hansen, Otto L. H. Hine, Edward F. Keys, Harry B. Laird, Harvey N. Lewis, James F. Maness, DeLorme B. Robinson, Geo. E. Roland, Elliott H. Rowland, William D. Rush, Burnham E. Shaw, Walter C. Shull, Warren S. Whittle, Loos E. Wiley, and Neal D. Williams.

To Camp Gordon, Atlanta, Ga.: John G. Arbenz, Albert L. Bartlett, William N. Crowl, Ellsworth E. Eskey, George E. Fussell, Neale R. Gunn, James F. Hall, Miguel Wise Jackson, George R. Lee, Earl N. McCue, Thomas M. Page, William E. Paul. Forrest DeW. Suggs, and George E. Walker.

To Camp McClellan, Anniston, Ala.: Culmer C. Benton, Malcolm Betha, Pierce A. Cassedy, Edgar A. Creighton, Walter M. Dunlap, George H. Elliott, Geo. A. Ferrell, Alfred K. Franklin, Morris Golden, Joseph S. Hamilton, Vaughn L. Maxwell, Albert B. Pancost, Leon Reisner, Harry M. Trafford, Harold Van Blarcom, and William A. Wood.

To Camp Pike, Little Rock, Ark.: Edgar T. Blocker, Merle W. Catterlin, Thomas M. Collins, Frank L. Cooper, Jesse J. Corley, Fred W. Dains, Roger L. Dill, George H. Elliott, Frank J. Fehrenbacher, James W. Ferguson, LeRoy M. Fink, Walter S. Francis, Grant C. Gentry, Roy C. Hoel, Francis M. Kane, Clarence P. Jackson, Charles A. McDermand, Richard W. McLean, DeWilton H. Milstead, Doyle B. Morris, Leo B. Muzzy, Brien B. O'Bannon, Charles E. Porter, Robert Redus, Henry W. Rich, James H. Shaw, and Frank R. Woods.

To Camp Beauregard, Alexandria, La.: John F. Ailworth, Edgar C. Berryman, William H. Brockman, William L. Conrad, Harry J. Dunshee, James M. Gray, Pierre O. Landry, Percy W. Pou, Bernard Ragland, Ruford A. Rice, William I. Setzekorn, Smith C. Tanner, William V. Thomson. Albert G. Tillman, jr., Ralph B. Tudury, William W. Westmoreland, jr., Roy White, and Walter F. P. Zell.

To Camp Kearny, Linda Vista, Cal.: Harold

Anderson, William Gordan Barnum, Alfred E. Bernstein, Wall M. Billings, Fred W. Burlingame, Richard M. Cerf, George B. Curtis, Francis E. Derham, Howard Dunn, Clarence A. Flanagan, Russell W. Force, John E. Frates, Maxwell T. Green, Henry L. Harris, Albert N. Johnson, John W. Leggett, Claude E. Markey, Arthur B. Mitchell, Samuel Shapiro, George A. Snyder, James F. White, and John J. White.

To Camp Mills, Garden City, Long Island: Charles H. Brown, Charles H. Cole, Howard I. Denio, Albert L. Geisenhoner, Joseph J. Dodson, Walter H. Harnisch, Leroy E. Knight, Ralph M. Knight, John R. Maxon, Harold P. Mead, Daniel B. Newton, George W. Phelan, Arthur Picker, John P. Reading, jr., Stanley S. Reynolds, Hamilton D. Smith, George E. Staats, John C. Tooke, Hugo M. Volmeke, James D. White, and Frederick H. Williams.

To Camp Sheridan, Montgomery, Ala.: Walter J. Abell, Francis A. Boylan, Elmer O. Doyle, Joseph I. Hartwig, Roy M. Jernall, Leon M. Muedeking, Edwin J. T. Simon, and Joseph P. Werrick.

To Camp Greene Charlotte, N. C.: George T. Baskerville, jr., Thomas J. Bland, jr., Julian B. Haller, Rollo I. Pusey, and Beaman Story.

To Camp Sevier, Greenville, S. C.: Walter F. Clayton, James G. Crutchfield, Wallace D. Gibbs, Ernest S. Hamilton, John H. Hughes, Benjamin C. Jones, Leslie J. Meredith, Robert H, Murphy, Alexander W. Nance, and Clarence H. Rangeley.

To Camp Hancock, Augusta, Ga.: Walton, J. Graft, George I. Jacquin, William B. Ley, Claude A. L. Lyon, Thomas W. Magner, William H. McElnea, Robert W. Meeker, Thomas C. F. Shirley, Floyd D. Soverel, and Raymond LeR. White.

To Camp Wadsworth, Spartanburg, S. C.: Clarence J. Appleget, John C. Dickinson, William M. Kester, Kenneth C. Pruden, Lee F. Strickler, and Harry L. Westney.

To Camp Bowie, Fort Worth, Tex.: Albert B. Crutcher, William F. Murphy, Rue P. Parcells, Nealie E. Ross, Harold B. Smith, and Orrin K. Weaver.

To Camp Cody, Deming, N. Mex.: Leroy C. Anderson, Louie T. Austin, Ingvald G. Bergh, Leonard C. Brusletten, Erwin F. Bruss, Archibald B. Butter, John J. Curran, Ray D. Curry, Patrick M. Dunn, Magnus A. Gerde, A. E. Nannestad, Albert W. Odell, Eldred C. Oswald, George H. Ribbel, Francis R. Steirly, Roscoe E. Stewart, Lewis R. Stowe, James J. Weeks, Louis R. Weiss, and Wayne W. Wooley.

To Camp Dodge, Fort Des Moines: Martin M. Block, Walter P. Christiansen, Leo V. Daniels, Oakley B. Davy, Francois J. P. DeGrasse, George N. Frost, Laverne H. Jacob, Ernest O. Lawing and Melford S. Sorley.

The following first lieutenants to camps for duty: Camp Gordon, Atlanta, Ga., Junius F. Emerson; Camp Grant, Rockford, Ill., Stanley G. Ewen; Camp Jackson, Columbia, S. C., Edward H. Dobson; Camp Kearny, Linda Vista, Cal., John H. Davis and James H. Johnson; Camp Meade, Annapolis Junction, Md., Wegor E. Mathison; Camp Pike, Little Rock, Ark., John F. Clark; Camp Sevier, Greenville, S. C., Willard J. Worsley; Camp Pike, Little Rock, Ark., Charles H. Masters; Camp Gordon, Atlanta, Ga., Samuel B. Ginsburg and Bernard R. Thornton.

1st Lieut. Denzil C. Barnhill to Fort Benjamin Harrison for duty.

1st Lieuts. William W. Peebles and Samuel H. Rosenberg to Fort Des Moines for duty.

1st Lieut. George A. Hewey to Yaphank, Long Island, Camp Upton, for duty.

1st Lieut. Theron J. Hickey to Fort Oglethorpe for duty.

1st Lieut. Robert E. F. Millington to Wrightstown, N. J., Camp Dix, for duty.

1st Lieut. Harld S. Flanagan to Gettysburg, Pa., for duty.

1st Lieut. Fred C. Sizelan to Waco, Tex., Camp MacArthur, for duty.

1st Lieut. A. F. Wilbur to New York with 8th reserve engineers.

1st Lieut. Edward R. Danforth to Fort Benjamin Harrison for duty.

1st Lieut. Henry T. Dean to Fort Riley for duty.

1st Lieut. Frank E. Hendrickson will proceed to Fort Constitution for duty.

1st Lieut. Weston B. Estes is assigned to active duty and will proceed to Fort Totten for duty.

1st Lieut. Charles F. MacDonald, jr., is assigned to active duty at Washington, D. C.

1st Lieut, Herman J. Keyser is assigned to active duty at Gettysburg, Pa.

The following named officers are assigned to active duty and will report by telegraph to the commanding general of the Southern Department for assignment to duty: First Lieutenants Joseph L. Brown, James A. Johnson, Chester M. Meares, Harry M. Nolan, John E. O'Flinn, James H. O'Reilly, George E. Sandoz, Vincent F. Schoppe, William A. Spence, and Clarence E. Wisecup.

1st Lieut. Stephan T. Bird is assigned to active duty at Washington, D. C., with 6th engineers.

1st Lieut. Charles F. MacDonald, jr., will proceed to New York, N. Y., and report to Lt. Col. Charles H. McKinstry, corps engrs., for assignment to duty.

1st Lieut. Roscoe C. Bratten is assigned to active duty at Washington, D. C., and report to Major Theodore C. Lyster, medical corps, for duty.

1st Lieut. Robert E. F. Millington to Wrightstown, N. J., Camp Dix, for duty.

1st. Lieut. Harold S. Flanagan to Gettysburg, Pa., for duty.

1st Lieut. Fred C. Sizelan to Waco, Tex., Camp Mac Arthur, for duty.

1st Lieut. A. F. Wilbur to New York with 8th reserve engineers.

1st Lieut. Edward R. Danforth to Fort Benjamin Harrison for duty.

1st Lieut. Henry T. Dean to Fort Riley for duty.

1st Lieut. James B. Harrington to Fort Williams for duty.

1st Lieut. Alphonse L. Senecal to Fort McKinley for duty.

1st Lieut. John G. Stack to Fort Andrews for duty.

1st Lieut. John G. Urban to Hawaiian Department for duty.

The following to places indicated for duty: 1st Lieut. Frank K. Garnar to Fort Banks and Leonard E. Powell to Fort Ethan Allen.

The following from St. Louis to Fort Worth, aviation school for duty: 1st Lieuts. Wendell A. Anthony, Earl N. Henderson and Harold E. Weir.

The following to St. Louis, School of Plastic and Oral Surgery, Washington University, for instruction: 1st Lieuts. Jacob Asch, Stephan H. Campbell, Frederick L. Finnegan, Joshua H. Gaskill, Cyrus C. Jones, Arthur H. Myers, John S. Owens, Leroy Tileston, Marvin V. Welcher, George A. Coleman and Walter H. McCreary.

The following to camps for duty: 1st Lieuts. Albert J. T. Beatty, Camp Gordon, Ga.; Frank A. Cairns, Camp Upton, Long Island; Austin R. Killian and Wm. W. Peet, Camp Grant, Ill.; Raymond G. Shepard, Camp Sherman, Ohio; Weston R. Anderson, Camp Lewis, Wash.; Henry S. Davis, Camp Sherman, Ohio; Lawrence P. Busby, San Antonio, Tex., Camp Kelly; Lee Van Sexton, Louisville, Ky., Camp Taylor, and Benjamin Fiedelbaum, Yaphank, Long Island, Camp Upton.

1st Lieut. S. F. French to Fort Oglethorpe.

1st Lieut. John J. Collins to Camp Grant, Ill. for duty.

1st Lieut. Roy Hudson to Camp Travis, Tex., for duty.

1st Lieut. Harry B. Riley from Camp Meade, Md., to Walter Reed General Hospital for duty.

1st Lieut. Hal N. Orr to St. Louis, School of Plastic and Oral Surgery, Washington University, for instruction and then to Augusta, Ga., Camp Hancock, for duty in the division of plastic and oral surgery.

The following to Camp Kelly, San Antonio, Tex., for duty: 1st Lieuts. Virgil M. Campbell, Fred L. Edele, Wm. P. Katz, Fayette D. Pendleton, Chester B. Parkinson and Charles W. A. Spies.

1st Lieut. Edwin T. Foster to Camp Sherman, Ohio, for duty.

1st Lieut. Roscoe C. Funk to Syracuse, N. Y., mobilization camp, for duty.

1st Lieut. George M. Kelly to Camp Dix, N. J., for duty.

1st Lieut. Milzer W. Deist to Camp Grant, Ill., for duty.

1st Lieut. Charles L. Snipes to Fort Douglas for duty.

1st Lieuts. Owen P. Gillick and Harry W. Porter to Ayer, Camp Devens, Mass., for duty.

1st Lieuts. Edward D. Scanlan, Norman E. Gardner and Bryant E. Hazen to Camp Meade, Md., for duty.

1st Lieuts. Oren W. Wallace and Wm. T. Davidson honorably discharged.

1st Lieut. John R. Quinn to Ayer, Mass., Camp Devens, for duty.

1st Lieut. Erwin I. Herzberg to Camp Grant, Ill., for duty with 35th engineers.

1st Lieut. Walter T. Avery to Little Rock, Ark., Camp Pike, for duty.

Assigned active duty Oct. 16: Lieut. C. W. Dowd, Camp Grant; Lieut. W. R. Scanlan, Camp Grant; Lieut. J. J. Lally, Camp Devens; Lieut. John McD. Eveleth, Fort Sam Houston; Lieut. C. W. Raymond, Camp Taylor; Lieut. A. E. Irving, Camp Kearny; Lieut. G. F. Brand, Rantoul, aviation school; Lieut. F. D. Diggs, Camp Greenleaf; Lieut. R. O. Leonard, Chandler Field, Pa.; Lieut. R. C. Kiebler, Camp Travis; Lieut. F. J. Marshall, Camp Devens; Lieut. W. S. Shuttleworth, Camp Meade; Lieuts. C. B. Hatrick and R. F. Rowdibush to American University camp with 20th engineers; Lieut. H. F. Besse to Camp Devens; Lieut. James M. Adair, Camp Lee; Lieut. Arno L. Brett, Camp Grant; Lieut. Harry W. Everett, Camp Funston; Lieut. Harold C. Gardenier, Camp Dix; Lieut. James M. Gilbert, Camp Gordon; Lieut. Timothy J. Greany, Camp Devens; Lieut. James B. Jones, Camp Gordon; Lieut. Paul B. Lail, Camp Taylor; Lieut. Horace E. Metzner, Camp Custer, and Lieut. Harold A. Tilton, Camp Dix.

Assigned active duty Oct. 17: Lieuts. Wm. J. Adlington, Camp Devens; Owen I. Bird, Camp Funston; Isaac O. Bishop, Jr., Camp Jackson; Arthur F. England, Camp Lewis; James B. Helton, Camp Gordon; Raymond C. Herman, Camp Dix; Wilbert McKee, Camp Lee; Charles C. Simmer, Camp Custer, and Eugene C. Stamm, Camp Funston.

1st Lieut. J. B. Eby to St. Louis, instruction, then to Camp Sherman.

1st Lieut. G. L. Walker to active duty, report to Southern Department.

1st Lieut. H. A. Wimberly to Camp Kelly.

NEW ARMY DENTISTS.

The following named candidates have qualified for appointment to commissions in the Army dental corps:

Chas. L. Andrews, Frankfort, Kan.

Julius L. Bischof, Belleville, Ill.

Chas. H. Bramwell, 932 West 32d street, Kansas City, Mo.

Alvin D. Dannheisser, 1112 Bell Bldg., Montgomery, Ala.

Raymond H. Fisher, 718 Hurt Bldg., Atlanta, Ga.

Jerome L. Fritsche, 2129 Emerson avenue, North, Minneapolis, Minn.

Clement J. Gaynor, 401 Central National Bank Bldg., St. Louis, Mo.

Dell S. Gray, Hale, Mo.

Henry L. Hogan, Covington, Ky.
Clarence R. Jacobson, Tracy, Minn.
George R. Kennebeck, Wall Lake, Ia.
George Krakow, Lagrange, Ill.
Hooker O. Lindsey, 326 Ward Bldg., Shreveport, La.
Neil J. McCollum, West Frankfort, Ill.
Wm. A. Moore, 308 Perkins Bldg., Lawrence, Kan.
Milton A. Price, Princeton, Minn.
Adrian C. Ragan, 201½ Broadway, Hannibal, Mo.
Joseph L. Rahm, Vine Grove, Ky.
Fletcher D. Rhodes, Cape Girardeau, Mo.
Alexander M. Smith, jr., 819 Second avenue South, Nashville, Tenn.
Boyd L. Smith, Albany, Mo.
Wm. B. Stewart, 1020 Lydia street, Kansas City, Mo.
Richard F. Thompson, 508 Corby-Forsee Bldg., St. Joseph, Mo.
William T. Williams, Tompkinsville, Ky.
Walter D. Vail, 800 Carleton Bldg., St. Louis, Mo.

There were 90 candidates who were examined, resulting in the qualification of those named above. A few of the papers of those not on this list are being reconsidered and may be pronounced as qualified later. The earlier list of those who qualified, 35 in number, was printed in the Army and Navy Register of August 18.

The next examination will be held in a few weeks. There are about 80 vacancies to be filled.

ARMY RESERVE OFFICERS.

It is held by the War Department in the case of members of the officers' reserve corps whose assignment to active duty has been announced by the War Department and there is some delay before they are directed by a department commander to report to their duty station that they are entitled to pay only from the date when they start to their place of duty in obedience to their orders. —*Army and Navy Register.*

THE IMPORTANCE OF MOUTH SPRAY.

Under conditions that involve the close association of large numbers of persons, as in the great military encampments, certain modes of infection acquire a kind of exaggerated importance. The transmission of disease germs in ways that are rare in normal every day life occurs with the greater frequency and has more far reaching consequences. Exposure to inhalation of mouth spray is one of the most serious dangers. The small droplets discharged from the mouth or nose in sneezing, coughing, laughing and loud talking float about in the air for some time, and may be carried by currents of air to a considerable distance. There is reason to believe from the experiments of Kohlisch with tubercle bacilli that the moist droplets which often contain a little mucous are more likely than dry dust to produce infection. Kohlisch, for instance, found in animal experience that fifty tubercle bacilli inhaled as bacterial spray produced over twenty lung nodules, while the inhalation of over 2,000 in the form of dry dust had a very irregular action, and in some cases evoked no pathologic change. It is a somewhat general belief that, in human tuberculosis, infectious droplets are a more frequent source of infection than dried sputum. In numerous other infections that enter by way of the respiratory tract, the inhalation of mouth spray coming from an infected person or healthy carrier seems the typical mode of infection. This is true in diseases like pneumonia, influenza and whooping-cough, and probably in measles. Epidemic meningitis is probably also most commonly spread in this way. The importance of the mouth spray in surgical wound infection is well known. In camp life, infection of this sort is notable, difficult to control. The rapidity with which measles and epidemic meningitis are likely to spread among new recruits is typical. Possibly increase of tuberculosis among troops is partly due to the increased opportunity for infection as well as to the influence of predisposing factors. It is doubtful whether hygienic instruction in the use of the handkerchief for smothering mouth spray from

the particularly mischievous sneezes and coughs would be immediately effective, altho every hygienically trained individual is a help toward the desired end. General camp measures that promote resistance to infection are always of value, probably especially so in meningitis, less of course in measles. If it were possible in cases of "cold" and the like in the incipient stage to make examinat' ns, and when necessary, to isolate the patients, the spread of mouth spray infection might be materially checked. This measure is worthy of consideration in all conditions in which there is any definite and serious respiratory tract epidemic. Known contracts may be kept under special surveillance and the cooperation of officers enlisted to detect early signs of infection. There is no single and universally applicable method for preventing the transference of germs from one soldier's respiratory tract to another's, but all reasonable and persistent attempts to prevent mouth spray infection are worth making. A person with the developed rash of measles or the skin-peeling of scarlet fever is not allowed to roam unchecked, if his condition is known; but little or no restraint is yet put either by health authorities or by public opinion on the wanderings of the much more dangerous person who is sneezing and coughing myriads of germs into the atmosphere. — *The Journal of the American Medical Association.*

CIVILIAN COOPERATION DESIRED.

The Council of National Defense Pushing Its Fight Against Venereal Diseases.

The General Medical Board of the Council National Defense has established a Sub-Committee for Civilian Cooperation in Combating Venereal Diseases, under the chairmanship of Mr. William H. Zinsser, of New York City. The American Social Hygiene Association has offered its facilities to this Committee, which will carry on much of its routine work in New York, using the offices of the Association as an informal extension office. Letters addressed in care of the Association will promptly reach the chairman.

The government has determined to try for a record in combating venereal diseases and has adopted a complete military program to fight this greatest of all disease scourges of the army. The plan which was tested experimentally on the Mexican border was found remarkably efficacious at certain encampments where both the military and civil forces cooperated. This plan may be divided into three phases:

First: Preventive and educational measures in the encampments themselves under military authority;

Second: The elimination by military and civil authority of saloons, prostitutes, and other harmful influences from a federal zone around each encampment and substitution of amusements including athletics, library facilities, social entertainments, and other forms of recreation;

Third: The organization of community effort to carry out similar measures in all the near-by cities and towns to which soldiers have ready access when on liberty and furlough.

The Sub-Committee on Civilian Cooperation will be especially concerned with the encouragement of this third part of the program and with the maintenance of a bureau of public information in cooperation with the American Social Hygiene Association. — *The Social Hygiene Bulletin.*

THE JOURNAL of the NATIONAL DENTAL ASSOCIATION

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Editor and General Manager.
OTTO U. KING. D. D. S., Huntington, Indiana.

Associate Editors,
THOMAS P. HINMAN, D. D. S., Atlanta, Ga.
HARVEY J. BURKHART, D. D. S., Rochester, N. Y.
THOMAS B. HARTZELL, D. M. D., M. D., Minneapolis, Minn.

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VOL. 4 NOVEMBER, 1917 No. 11

Editorial Department.

DENTAL PROGRESS AND ACHIEVEMENTS.

The dental historian will be compelled to chronicle that the progress made by the dental profession during 1917, has been phenominal,—an unprecedented record of professional advancement and achievements.

The President in the climax or summary of his address, states tersely—giving us in bold relief, the marvelous record during his administration, from which we quote as follows:

"First, the establishment of The Journal of the National Dental Association on a monthly basis.

Second, the membership has been increased 2,000, notwithstanding the

increase in dues, and the depressing influence the war has had on all organizations.

Third, the relief fund has been increased over $7,000.00, making the total Relief Fund over $20,000.00.

Fourth, $8,000.00 has been raised for the Black Memorial.

Fifth, $2,000.00 has been added to The Journal Fund.

Sixth, the assets of this Association in Furniture, Fixtures and Supplies, has been increased $2,400.00.

Seventh, notwithstanding these facts, we still have a balance of several thousand dollars in the Treasury.

Eighth, even under our unfavorable status in the Federal Service, the patriotic spirit of the dental profession has been manifested during this war crisis by the fact that the Army and Navy Corps have their full quota.

Ninth, the crowning achievement of this Administration, as well as what I believe to be the greatest advancement in the history of dentistry, was the legislation secured in the closing days of the last Congress, which places our representatives in the Army Dental Corps and the dental students on an equal status with the Army Medical Corps and the Medical students."

A careful review of the above facts should convince the most skeptical of the great advantage, as well as the necessity for a large and well organized National Association. Without organization, the results of this year's achievements in our profession could not have been consummated.

Be it also said to the credit of our organized profession, that the fine spirit of harmony and cooperation was most commendable, and was another important factor in our success.

Thus, knowing the true facts upon which our success has been attained, we should guard jealously these basic principles, and see that harmony, cooperation and a successful organization continue to grow and develop in our profession

THE SIGNIFICANCE OF THE RECENT LEGISLATION AT WASHINGTON.

When, on October 6th, 1917, there was passed by Congress and signed by the President, a bill giving the same rank to the Dental Corps of the Army as that enjoyed by the Medical Corps, a great stride in advance was made in placing the dental profession on a recognized basis. The bill reads as follows:

"Provided, That hereafter the Dental Corps of the Army shall consist of commissioned officers of the same grade and proportionally distributed among such grades as are now, or may hereafter be provided by law for the Medical Corps, who shall have the rank, pay, promotion, and allowances of officers of corresponding grades in the Medical Corps, including the right to retirement as in the case of other officers, and there shall be one dental officer for every thousand of the total strength of the Regular Army, authorized from time to time by law:

Provided Further, That dental examining and review boards shall consist of one officer of the Medical Corps:

And Provided Further, That immediately following the approval of this act all dental surgeons then in active service shall be recommissioned in the Dental Corps in the grades herein authorized in the order of their seniority and without loss of pay or allowances, or of relative rank in the Army.

Provided Further, That no dental surgeon shall be recommissioned who has not been confirmed by the Senate.

All regulations concerning the enlistment of medical students in the Enlisted Reserve Corps and their continuance in their college course while subject to call to active service, shall apply similarly to dental student."

Never before has there been a more significant piece of legislation passed affecting the status of dentistry. It places the profession where it belongs—side by side with the great healing art. It does more. It serves notice to the world that official Washington recognizes the great service which dentistry is capable of giving to the Army and Navy, and that is tantamount to saying that it becomes at once an integral part of the great body politic—a prophylactic, sanitary and economic asset. The practice of dentistry can no longer be considered an individual matter; it is a community matter. We henceforth hold a relationship to the people which gives us not only an added status but an added responsibility. The action of Congress was at the same time a compliment and a challenge. It expressed confidence in an ability to aid the Government in a very vital way, and it assumed inferentially, that we would measure up to the estimate it had placed upon us. Shall we do it? Every practitioner and student of dentistry must ask himself this question. There never was a time when so much was at stake as now. No man has a right to call himself a dentist hereafter who will not open-heartedly devote some of his time and energy to the service of the Government under which he lives. It may be in one way—it may be in another. The Government practically says that a dentist need not go into the trenches, and in this the Government is wise. Much cruel wastage has occurred in Europe by placing professional men in the line of battle and having them killed, when they would have been of infinitely greater service in some other capacity.

In 1914 the British War Office was reorganized under Lord Esher, who was requested to provide for Medical Representation in this office. He replied: "The Army Council is not and cannot be a representative body as regards the several arms and departments. The Royal Army Medical Corps exists to serve the Army in a most important capacity, but the first object must be to create and maintain an army and this is the function of the Army Council."

This was in 1914. Recently, Lord Esher writes:

"How much of the suffering undergone by our soldiers since the

war began has been due to the shortsightedness of my Committee and notably of myself, will never be known. Certainly the control of the Adjutant General's branch over the Royal Army Medical Corps was, and is, responsible, not only for the early failure to grip the medical factors of the war, but they hampered conditions under which the Surgeon General has worked. His triumph and those of the Royal Army Medical Corps have been achieved in spite of obstacles that the subordination of science to ignorance and of elasticity to military discipline explains but cannot justify."

These are strong words coming from a broadminded official. Professional men of the right type can do more good in serving the Nation in their respective capacities than by fighting in the trenches. Our Government is wiser in this regard than some of the older countries.

Let it be said that this legislation was not passed without much effort. There are some men—many of them—to whom great credit is due for the passage of this measure. The Legislative Committee of the National Dental Association did yoeman service in pushing the provision for advanced rank in the Army Dental Corps, the Committee of Deans of Dental Colleges did as much for the provision exempting dental students from active service and placing them in the Reserve list where they might be permitted to continue their studies in dental colleges and prepare for graduation. There is no question that the thousands of letters which flooded the officials at Washington on behalf of this measure, sent there thru the suggestion of this Committee, had much to do with influencing legislation. And there was one more, an instance emphatically of the right influence and cooperation in the right place. It is doubtful, even with all of the other agencies at work, if this measure, crowded as it was into the last moment of Congress, could even have been put thru had it not been for the approval and support which it received from the Surgeon General's Office. When the history of dentistry in America shall have been written, the year of 1917 will stand out conspicuously as a milestone of progress.

Now, what remains? This—that the confidence just reposed in Dentistry by our Government shall never be betrayed by negligence, indifference, or lack of devotion; that we shall cooperate with the Medical Profession in every conceivable way to safeguard the health of the present wards of the Government—the Army and Navy; that we shall at all times cultivate the scientific resources of our profession, not only in our educational institutions, but in our dental association work, to the end that we may be equipped in the best possible manner to render the service which the United States Congress has just indicated by its action to be of such vital importance. This we **can** do; and this we must

do. Let no member of the profession feel that it is not within his province to do something toward this work. Every man should put his shoulder to the wheel and lift his utmost in any capacity which presents itself for the betterment of his profession, his community, and the beneficent Government under which he lives.

"Lest we forget"—The fundamental basis of our success has been due to a great working organization.

THE NEW YORK SESSION.

Notwithstanding the war, the 1917 annual session held in New York City, October 22-26, was a great success. The total registration, 4,589, establishes a new high-water mark in our National Dental Association meetings.

The first general session held on Tuesday at 10:30 A. M., in the Grand Ball Room, Hotel Astor, was very well attended. In fact, every available seat was taken, and hundreds remained standing during the entire session. The profession at this meeting showed its patriotism by purchasing $18,000 of Liberty Loan Bonds. In fact, $55,500 was subscribed for Liberty Loan Bonds during the meeting.

At the second general session, Tuesday evening, after a fine patriotic speech had been given by one of our members, special resolutions addressed to the President of the United States were adopted, pledging our loyalty, professional ability, and lives, if necessary, for the service of our Country, in this great war crisis.

All general sessions were unusually well attended. Many of the papers, addresses, and discussions, not only in the general sessions, but in section meetings, evidence the intense interest of the dental profession in the Nation's crisis.

Reports from all sections and clinics show that the attendance was good, the papers excellent, and the discussions interesting.

The arrangement for housing the sections, the giving of our entire program under one roof, made all general sessions, section meetings, House of Delegates meetings, accessible one to the other, and undoubtedly account for the large attendance at the various meetings.

The entire transactions of the 1917 meeting will be published in the December Journal, and the papers will be published in The Journal during 1918.

DENTISTRY IN THE WAR.

The lack of adequate preparation for the war on the part of the Government, has been a common topic of conversation. This was due

to two causes—one that our people are peace loving and cherished the hope that they would not be drawn into the conflict—the other was the lack of appreciation of the value of being fortified and properly equipped for any emergency that might arise, to protect and safeguard the Nation.

The process of awakening the people to a realization of their danger and what war really means has been slow, tedious and extremely difficult. Business and professional men, for the most part, were too much engrossed with their own affairs to give much consideration to anything not requiring immediate attention. This, however, cannot be said of dentistry. From the time of the very beginning of hostilities in Europe, dentists in various parts of the country advocated the organizing of the profession to properly care for the teeth of the soldiers, in the event of the country being thrown into war. The foresight which was displayed by dentistry is in striking contrast with the lack of activity elsewhere.

Dental societies in every part of the country have been keen to appreciate that an opportunity for real service was before them, and long before war was declared, prepared their organizations to properly and efficiently care for the mouths of prospective soldiers. Everywhere clubs and leagues were organized to assist exemption boards in making examinations. Offices were opened where recruits, who were unable to employ a regular practitioner, might have their teeth placed in proper condition. Not only societies but private practitioners did their utmost to save for the Army and Navy, men who only needed dental attention to qualify them for service.

The willingness to serve and the enthusiasm which animated the dental profession in this work has been most gratifying. The far reaching benefit of the work done will be appreciated when it is known that the mouths of over one hundred and twenty-five thousand soldiers have been placed in proper condition, with absolutely no cost to the Government, other than for, in some cases, the use of armories and places in which to do the work. The tremendous amount of the work done and its importance must be apparent when it is known that over 10% of the first draft call needed dental work to qualify them physically for Army service. Already plans have been made to examine and care for those who will require dental service to fit them for the second draft. This has been and will be volunteer work and in no way connected with the work of regular or reserve corps dental officers.

The response to the call to duty was prompt and generous everywhere. Colleges, infirmaries and private offices all over the country were made available for this work. There were no slackers to be found in the den-

tal profession. The energy and enthusiasm displayed and the desire on the part of both old and young practitioners to do their part, has been commendable. It is a real satisfaction to observe the fine spirit which has animated the profession in this preparedness work.

Not the least gratifying feature of dentistry in the war is the prompt and ready response for service in the regular Army Dental Corps and the Dental Reserve Corps. On the basis of one dentist to one thousand enlisted men, there have been examined and are available for the call of duty, enough dentists to supply an army of three and one-half million men. The showing made by dentistry in volunteering for Governmental service has been highly pleasing and gratifying, and is in striking contrast to the reluctance and backwardness on the part of other professions in responding to the call to the colors. Few in any business or profession have made the real sacrifice financially, that have those in the dental profession who have accepted commissions and active service, whether it be in the routine departmental work at the National Capitol or in army camps. It is no small matter to give up a remunerative practice for the meagre pay of an Army or Navy dental surgeon. The promptness and the readiness with which dentists have put aside their own affairs to serve their Country and humanity, has been a lovely example of true patriotic and humanitarian spirit.

At the beginning of the war, members of the Dental Reserve Committee Council of National Defense rendered valuable service in the standardization of dental equipment and assisting the Government in formulating plans to raise the standard of efficiency in every direction of dental activity. The work of this committee has received the warm commendation of Governmental officials.

The generosity displayed and the material help given by dentists thruout the country in contributing to and assisting the Red Cross and the Government in helping to make a success, the various financial projects has been most commendable and praiseworthy. A number of ambulances fully equipped have already been donated to the Government, and there are funds on hand to provide many more. It may be observed in passing, that the United States Government and the Red Cross have adopted, as a standard, the ambulance and equipment recommended by the dental committees.

Too much credit cannot be given to our brethren abroad, who at the very beginning of the war, raised the flag of dentistry over the American Ambulance Hospital in Paris, and since that time have rendered the splendid service which has brought to American dentists the applause of the world for real disinterested service of the very highest character. The pictures which have been shown and the stories told about the won-

derful work done by dentists, in plastic surgery, the treatment of fractured jaws and the supplying of artificial substitutes will go down as one of the most brilliant chapters in American dentistry.

The passage of the Lodge bill by Congress, giving equal rank with medical men is a matter for congratulation, and to a considerable extent was brought about by the added respect in which dentistry is held by the people, due in a large measure to an appreciation of the needs and value of dental service, to properly fit men to become part of the fighting machine.

The work which is now being done by members of the Army Dental Corps and the Dental Reserve Corps, in cantonments, at home and abroad, is receiving the hearty commendation of Army officers. For many years dentistry asked and sought the opportunity to demonstrate its need and value to the Government, and it should be a matter of pride and gratification to the profession, that when the opportunity finally came, its members were ready to promptly and generously respond to the call, and to show by their good works that dentistry was a necessary part of the service in the caring for the health of the soldier and assisting him to maintain his efficiency and retain his place in the ranks.

The officers and members of the National Dental Association have, from the beginning of the war, been fully alive to the needs of the situation, and the demands, which would be made from time to time, for a whole hearted and generous support in this great crisis. Dentistry has done its part well, and in the future, as in the past, will be found, ready and willing to meet any emergency and work shoulder to shoulder with the other professions, to promote the comfort and happiness and efficiency of the men who will fight the Nation's battles.

OFFICERS ELECTED AT NEW YORK MEETING.

Wm. H. G. Logan, President	Surgeon General's Office, Washington, D. C.
C. Victor Vignes, President-Elect	830 Canal St., New Orleans, La.
M. E. Vance, First Vice-President	407-9 Ganter Bldg., Lincoln, Nebr.
Henry A. Kelley, Second Vice-President	727 Congress St., Portland, Maine.
Clarence J. Grieves, Third Vice-President	207 W. Madison St., Baltimore, Md.
Otto U. King, General Secretary	Huntington, Ind.
Arthur R. Melendy, Treasurer	Holston Nat'l Bank Bldg., Knoxville, Tenn.

NEW MEMBERS OF BOARD OF TRUSTEES.

H. J. Burkhart	Rochester, N. Y.
J. P. Buckley	Chicago, Ill.
Thomas P. Hinman	Atlanta, Ga.

1918 meeting will be held in Chicago.

Deaths

Dr. William A. White, of Phelps, N. Y., one of the best known and most prominent dentists in the State of New York, died at his home, at five o'clock on the morning of October 14th. Dr. White had been in failing health for several years, but his last illness was of comparatively short duration.

Dr. White was born in Albany, September 14th, 1857, and practiced his profession in Phelps for thirty-six years. He was graduated from the Baltimore College of Dental Surgery class of 1881. Soon after his graduation, he commenced to take an active part in all matters pertaining to organized dentistry. He had held the office of president of the Seventh District Dental Society and of the Dental Society of the State of New York. In 1908, he was appointed to fill the vacancy on the State Board of Dental Examiners, caused by the death of Dr. Frank French, which position he held at the time of his death. He was for some years connected with the New York State Department of Health, as a consultant and lecturer, and lectured extensively thruout the State before schools and various other organizations, on matters pertaining to Oral Hygiene. Dr. White was an indefatigable worker in any activity with which he was associated. His enthusiasm and energy in all matters relating to Hygiene made him a very valuable and prominent figure in the Oral Hygiene propaganda. His work along this particular line has been to a considerable extent original and very valuable in stimulating health and school authorities to appreciate its value.

Dr. White enjoyed a very wide acquaintance among the members of the profession, not only in his own state, but thruout the country. He was a constant attendant upon meetings of the National Association, and was interested in all of its activities. He had a pleasant and genial personality and the faculty of not only making friends, but of retaining them. His death will be mourned by a very large circle of friends thruout the country.

Dr. White was also interested in civic affairs in his own town, having served five years as a member of the Board of Education, and in various other positions in village affairs. He was a member of the Presbyterian church and treasurer of the Sunday School for a quarter of a century, and a member of the local Masonic lodge.

The funeral was held on Friday afternoon, October 19th, and was attended by the members of the State Board of Dental Examiners, a large delegation from the State Association and from the Seventh District Society. The regard and esteem in which he was held by his friends and neighbors is evidenced by the large number who were present to pay their last tribute to an old friend and neighbor.

He is survived by his wife and two children, Mrs. George H. Nelson, of Chicago, and Harry White, of San Diego, California, who have the sincere sympathy of a wide circle of friends.

W. W. SMITH, D. D. S.,
Rochester, N. Y.

Dr. John G. Peach, Lamont, Okla., died October 1, 1917, at the St. Francis Hospital, Wichita, Kansas, where he had been operated on for appendicitis, September 23. Death was caused by Embolism.

NATIONAL SOCIETIES.

National Dental Association, Chicago, 1918.

National Association of Dental Faculties, Chicago, 1918.

National Association of Dental Examiners, Chicago, 1918.

Xi Psi Phi Fraternity, Chicago, 1918.

Association of Military Dental Surgeons, Chicago, 1918.

STATE SOCIETIES.

November.

District of Columbia—Nov. 20, 1917. Washington, D. C.

December.

Ohio—Cleveland, December 4, 5, 6.

January.

Rhode Island—January, Providence.

March.

Vermont—March 20-22. Place to be decided by executive committee.

April.

Michigan—April 11-13, 1918, Detroit.

Kansas—April 15-17, 1918, Topeka.

South Dakota—Sioux Falls.

Texas—April 10-11-12, San Antonio.

Connecticut—April 18-19-20, Taft Hotel, New Haven.

May.

Indiana—May 21-22-23, 1918, Claypool Hotel, Indianapolis.

Iowa—May 7-9, 1918, Des Moines.

Mississippi—May 7, 1918, Meridian.

Massachusetts—May, Boston.

June.

Kentucky—June 13-15, 1918, Lexington.

Wyoming—June 10, Thermopolis.

Georgia—June 12-13-14, Atlanta.

New York—June 12-13-14, Saratoga Springs, N. Y.

Colorado—June 20-21-22, Estes Park.

July.

Wisconsin—July, Milwaukee.

Dates to be Announced.

South Carolina—Jefferson Hotel, Columbia.

Utah—Salt Lake City.

STATE OF OKLAHOMA BOARD OF DENTAL EXAMINERS.

The next regular semi-annual meeting of the Oklahoma Board of Dental Examiners will be held in Oklahoma City, Skirvin Hotel, beginning Dec. 10th. For further information write

H. OVERBEY, Secretary,
Ryan, Oklahoma.

SOUTH DAKOTA STATE BOARD OF DENTAL EXAMINERS.

The South Dakota State Board of Dental Examiners will hold its next examination at Sioux Falls, S. Dak., beginning January 7th, 1918. All applications must be in the hands of the Secretary by January 1st. Fee $25.00. Address

ROBERT JASMANN, Secretary,
Scotland, So. Dak.

OHIO STATE DENTAL SOCIETY.

The Fifty-first annual meeting of the Ohio State Dental Society will be held in Cleveland, December 4, 5 and 6, in the Hollenden Hotel.

The program promises one of the greatest and best dental meetings ever held. Among the speakers already announced are Doctors T. W. Brophy, J. P. Buckley; N. S. Hoff; Carl Lucas; Richard H. Riethmueller; Geo. H. Fette and W. H. O. McGeehe. War Surgery will have a prominent place on the program.

A new feature, under the supervision of Dr. Weston A. Price, will be a "Seminar" covering the entire field of Non-Vital Teeth. "Evidence, not option, to be used" and to be comprised in a series of twelve ten minute discussions, further exemplified by progressive clinics.

Other clinics will cover the field of the management of vital teeth for supporting artificial substitutes.

There will be no general discussions, the entire time being devoted to papers, lectures and clinics.

The display of dental supplies will be unusually complete and Tuesday forenoon and Thursday afternoon have been set aside as special Exhibitors' Sessions.

Come for the first days program and bring note books and pencil.

F. R. CHAPMAN, Secretary,
305 Schultz Bldg., Columbus, O.

NOTICE OF THE ANNUAL MEETING OF THE DENTAL PROTECTIVE ASSOCIATION OF THE UNITED STATES.

The Annual Meeting of the Dental Protective Association of the United States will be held at the Palmer House, State and Monroe streets, Chicago, on the third Monday of December, the 17th, at 4 P. M. sharp. The report of the officers, including the status of the litigation with the Carr patents, will be given; a board of Directors will be elected, and such other business transactions as should come before the Association.

Heretofore each member has received a postal card notice of the Annual Meeting. This will not be done hereafter for the reason that it was voted by the members at the meeting last year to discontinue the individual notice; substituting therefor the publication of a general notice in The Journal of the National Dental Association, and all other important dental Journals.

All members are urgently requested to be present.

By order of the Board of Directors.

J. G. REID, Pres.
J. P. BUCKLEY, V. P. and Sec'y.
D. M. GALLIE, Treas.

IOWA STATE BOARD OF DENTAL EXAMINERS.

The next meeting of the Iowa State Board for the examination of applicants will be held at Iowa City, Iowa, commencing December 3rd at 9:00 A. M.

For further information address the secretary.

DR. J. A. WEST,
417 Utica Bldg.,
Des Moines, Iowa.

NEW MEMBER ON MISSISSIPPI BOARD.

Governor Bilbo, of Mississippi, has appointed Dr. R. S. Russ of Biloxi, as a member of the Board of Dental Examiners to succeed Dr. T. L. Massey, of Bay Springs, who resigned. At a special called meeting of the Board, Dr. Burt J. Marshall, of Marks, was chosen Secretary of the Board to succeed Dr. H. J. Arledge, of Poplarville, who resigned this office but retains his membership on the Board.

VIRGINIA STATE DENTAL ASSOCIATION.

The Virginia State Dental Association will hold its next annual session at Roanoke, Virginia, April 25, 26 and 27, 1918.

An unusual program is being prepared and cordial invitation is extended to all ethical dentists in the State to attend this meeting.

F. R. TALLEY,
Petersburg, Pa.,
Corresponding Sec'y.

NORTH CAROLINA STATE BOARD OF DENTAL EXAMINERS.

The next meeting of the North Carolina State Board of Dental Examiners will be held at Raleigh, N. C., beginning at 9:00 o'clock on Thursday morning, January 10th, 1918.

For further information and application blanks address the Secretary.

DR. F. L. HUNT, Secretary,
Asheville, N. C.

COLORADO STATE BOARD OF DENTAL EXAMINERS.

The Board of Dental Examiners of the State of Colorado, will meet in Denver, Colorado, Tuesday, December 4th, 1917, at 8 a. m. for examination of applicants for license to practice dentistry in the State of Colorado.

In addition to the written examination, applicants must supply their own patients, instruments and materials, and come prepared to do practical work under the supervision of the Board.

All applications must be in the hands of the Secretary not later than December 1, 1917.

For application blanks and information, address R. C. QUICK, Secretary,
310 Metropolitan Bldg.,
Denver, Colo.

KANSAS STATE BOARD OF DENTAL EXAMINERS.

The Kansas State Board of Dental Examiners will meet at National Hotel, Topeka, Kansas, Nov. 19th, beginning at 7:30 P. M., for the purpose of examining any who may wish to practice dentistry in Kansas. For further information, write the undersigned.

G. F. AMBROSE, D. D. S., Sec'y,
Eldorado, Kansas.

INDIANA STATE BOARD OF DENTAL EXAMINERS.

Next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, November 12-17, inclusive. Applications and other information may be obtained by addressing H. C. McKittrick, Secretary, Indianapolis.

H. C. McKITTRICK.

SPECIAL REPORT FROM LABORATORIES DENTAL DEPARTMENT, UNIVERSITY OF CALIFORNIA.

To the Members of the Dental Profession:

The Dental Department of the University of California is endeavoring to make the library as complete a unit of dental literature as possible, and to that end we desire your assistance. Can you help this "preparedness" movement by contributing any of the numbers listed below? If so, will you mail them? In addition to this list we desire old numbers of all dental journals or textbooks.

ROBERT E. KEYS,
Librarian Dental Dept.,
University of California,
San Francisco, Cal.

American Journal of Dental Science.
Archieves of Dentistry.
Australian Journal of Dentistry.
British Dental Journal.

Bulletin of the California State Dental Association. All numbers.

"Chaff." All numbers.

Dental Jairus (Sacramento).

Dental Register.

Dental News Letter, 1874-52.

Dominion Dental Journal. All.

Herald of Dentistry, 1881-1885.

Independent Practitioner, 1880-83.

International Dental Journal.

Items of Interest, 1879-83. Only.

Journal of the Allied Societies. All.

Journal of the National Dental Association.

Missouri Dental Journal.

Northwestern Journal of Dentistry (Portland).

Pacific Dental Gazette. Any of the first twelve numbers.

Pacific Dental Journal (Tacoma). All numbers.

Trans. California State Dental Association.

Trans. National Dental Association.

American Dental Weekly, Atlanta, Ga., 1897. Want Nos. 20, 21, 23, 31, 36, 37, 38, 39, 40, 41, 44, 45, 46, 47, 49.

American Journal of Dental Science. 1st series. All. Second series, Vol. 3, 10, and index of Vol. 1. Third series, 1878, Vol. 11, want all; Vol. 23, want 10, 12; Vol. 18, want 6, 9, 12; Vol. 24, want 5; Vol. 26, want 12; Vol. 27, want 3 to 7; Vol. 30, want 6; Vol. 32, want 12; Vol. 33, want 1, 2, 3, 4, 7, 9, 11, 12; Vol. 34, want 1, 2, 10, 4, 5, 8, 9; Vol. 35, want 7; Vol. 36, want 8; Vol. 40, want 4, 5, 6.

Archieves of Dentistry. 1st series. Was Missouri Dental Journal. New series, 1884: Vol. 1, want 10, 11; Vol. 8, want 6, 7, 9, and all subsequent.

Archieves Fur Zahnheilkunde. 1900, wants Nos. 1, 2, 5, 6, 7, 8; 1901, want Nos. 9 to 20, inclusive; 1912, want all but No. 29; 1903, want all but No. 36; 1904, all; 1905, all; 1906, all except 8 and 12; 1907, No. 2; 1910, No. 6; 1911, No. 12.

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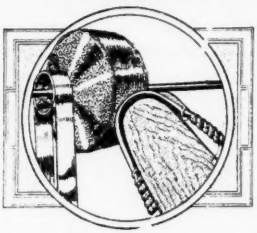

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